M I T S U B I S H I

Electronic Multi-Measuring Instrument

Programming Manual (CC-Link)

For ver.2 remote device station

Model

ME96SSH-MB or ME96SSR-MB with Optional Plug-in Module : ME-0040C-SS96

LEN130391

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1. General Description

This manual describes the programming methods that should be created by the user for monitoring measurement value of the Electronic Multi-Measuring Instrument (called ME96 from here on) with the CC-Link (in remote net ver2 mode or remote net additional mode).
In programming, read the following related manuals in addition to this mannual.

Table 1.1 Related Manuals

Manual Name	Manual No.
CC-Link System Master/Local Module User's Manual type QJ61BT11N	SH-080394E (13JR64)
User's Manual for ME96	Supplied with product or download.

NOTICE

When using ME96, Optional Plug-in Module "ME-0040C-SS96" is necessary. CC-Link communication is not available without the optional plug-in module. In this manual, "ME96SSH-MB" or "ME96SSR-MB" means the main device of ME96 with the optional plug-in module.

POINT

The ME96 must be handled after setting of the remote device station version. Set the remote device station version with the "Setting Menu 2" of the ME96.

Use the following as a guideline in setting the remote device station version and set the version at ME96.

Mode select setting	Guideline for selection
Ver.1 remote device station (Ver.1 compatible slave station)	Select this when utilizing the conventional program, because of compatibility with ME96NSR.
Ver.2 remote device station (Ver.2 compatible slave station)	Select this when configuring a new system or the being newly added to the existing system in combination with the applicable master module.

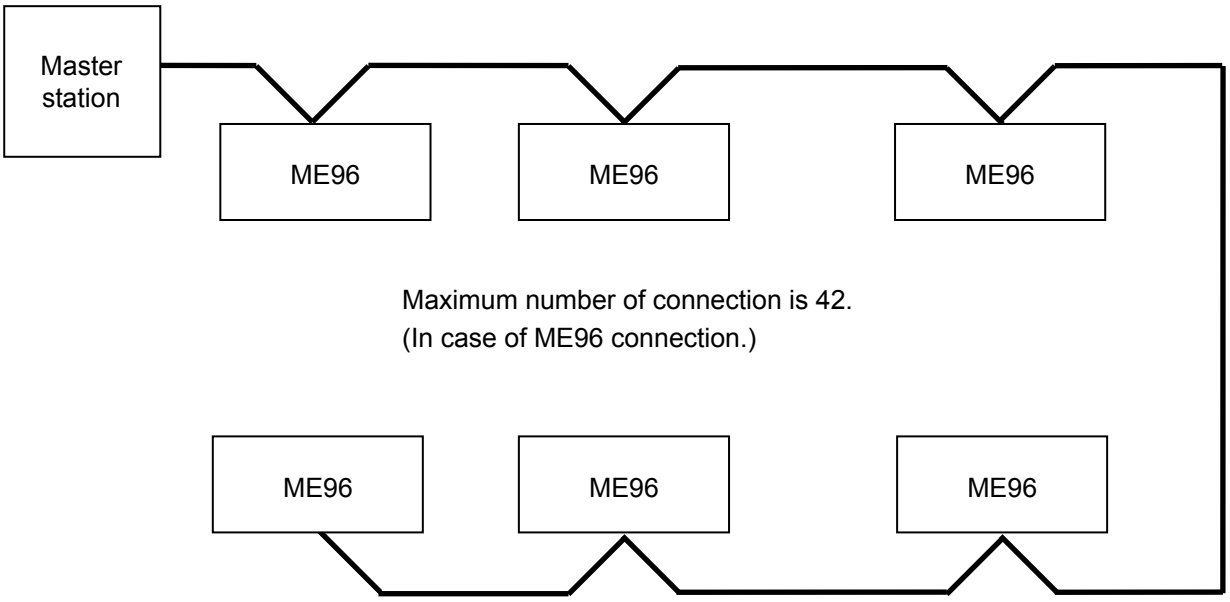
This programming manual is for ver.2 remote device station.
For use in the ver.1 remote device station (Ver.1 compatible slave station), refer to the following manual.
・Electronic Multi-Measuring Instrument Programing Manual (CC-Link)(For ver.1 remote device station)
..... LEN080334

2. Specification

CC-Link specification is shown in Table 2.1 when ME96 is set the “Ver2.00” (ver.2 remote device station).

Table 2.1 CC-Link Specification (For Ver2.00)

Item	Specification
CC-Link station type	Remote device station (ver.2 remote device station)
Number of occupied stations	1 station (Expanded cyclic setting: Octuple)
Maximum number of stations per master station	42 stations (In case of connecting only remote device station occupied by 1 station(Octplue).)
Transmission speed	156kbps/625kbps/2.5Mbps/5Mbps/10Mbps
Remote I/O (RX, RY)	128 points each
Remote register (RWw, RWr)	32 points each



System Configration (CC-Link)

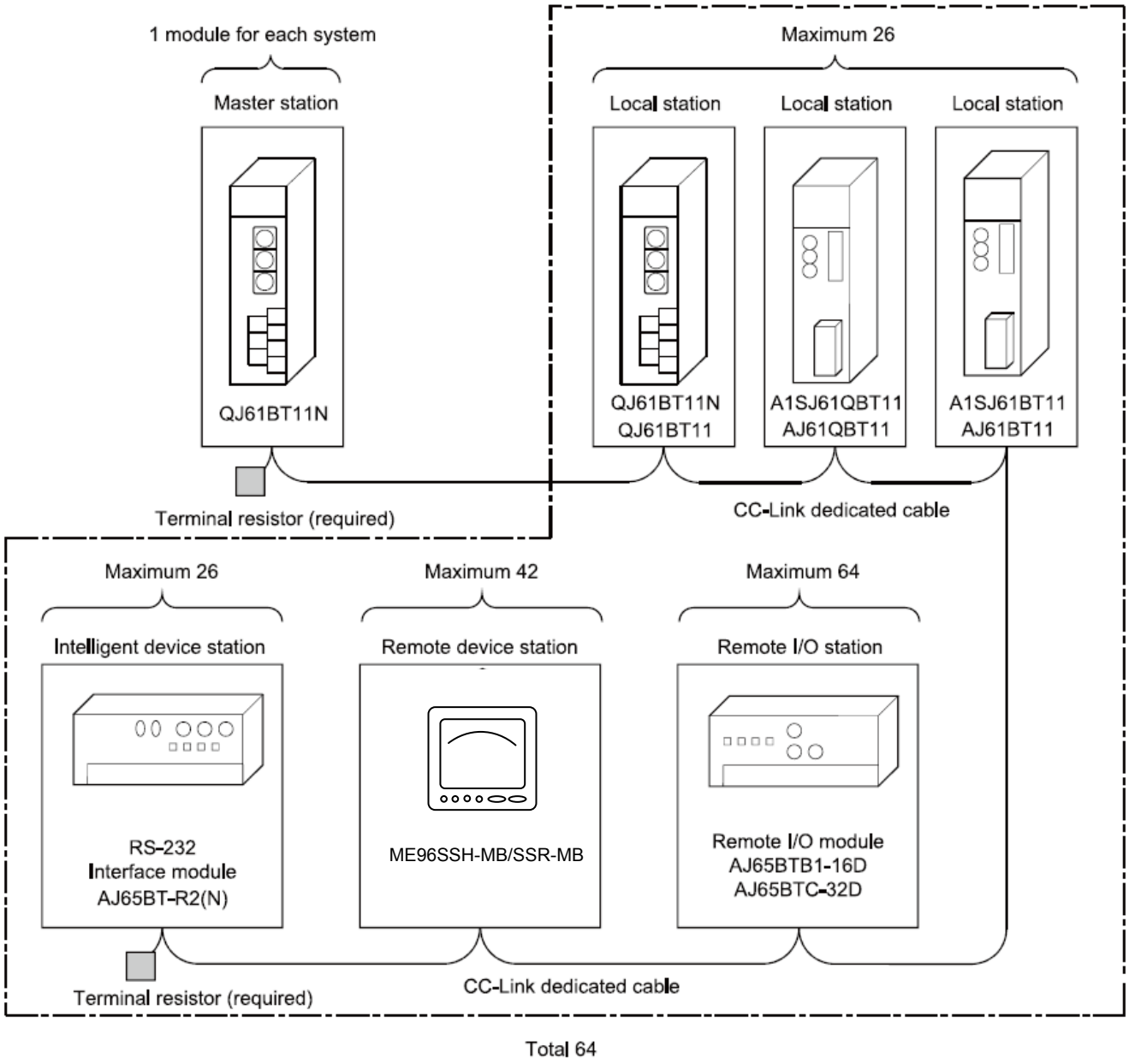
3. Configuration Conditions of CC-Link System

3.1 Remote net ver.2 mode, remote net addional mode

A total of 64 remote I/O stations, remote device stations, local stations, standby master stations, or intelligent device stations can be connected to a single master station.

However, the following conditions must all be satisfied.

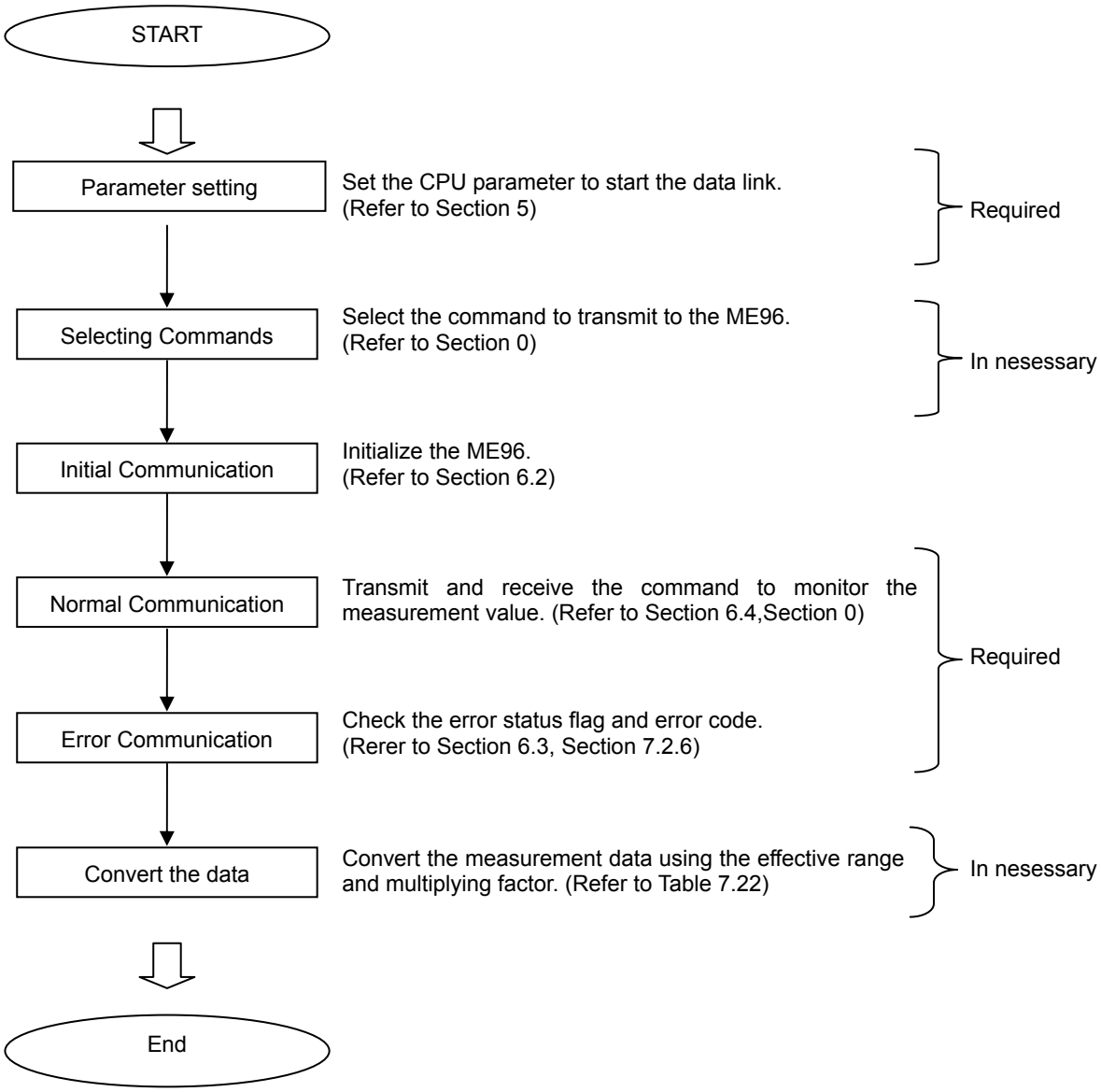
<table>
<tr><td>Condition 1</td><td>{(a＋a2＋a4＋a8)
＋(b＋b2＋b4＋b8)×2
＋(c＋c2＋c4＋c8)×3
＋(d＋d2＋d4＋d8)×4}≦64</td><td rowspan="3">a: The total number of ver.1 compatible slave stations that occupy 1 station, and ver.2 compatible slave stations that occupy 1 station which are set to “Single”.
b: The total number of ver.1 compatible slave stations that occupy 2 stations, and ver.2 compatible slave stations that occupy 2 stations which are set to “Single”.
c: The total number of ver.1 compatible slave stations that occupy 3 stations, and ver.2 compatible slave stations that occupy 3 stations which are set to “Single”.
d: The total number of ver.1 compatible slave stations that occupy 4 stations, and ver.2 compatible slave stations that occupy 4 stations which are set to “Single”.
a2: The number of ver.2 compatible stations that occupy 1 station which are set to “Double”.
b2: The number of ver.2 compatible stations that occupy 2 stations which are set to “Double”.
c2: The number of ver.2 compatible stations that occupy 3 stations which are set to “Double”.
d2: The number of ver.2 compatible stations that occupy 4 stations which are set to “Double”.
a4: The number of ver.2 compatible stations that occupy 1 station which are set to “Quadruple”.
b4: The number of ver.2 compatible stations that occupy 2 stations which are set to “Quadruple”.
c4: The number of ver.2 compatible stations that occupy 3 stations which are set to “Quadruple”.
d4: The number of ver.2 compatible stations that occupy 4 stations which are set to “Quadruple”.
a8: The number of ver.2 compatible stations that occupy 1 station which are set to “Octuple”.
(ME96 is applied)
b8: The number of ver.2 compatible stations that occupy 2 stations which are set to “Octuple”.
c8: The number of ver.2 compatible stations that occupy 3 stations which are set to “Octuple”.
d8: The number of ver.2 compatible stations that occupy 4 stations which are set to “Octuple”.</td></tr>
<tr><td>Condition 2</td><td>[{(a×32)＋(a2×32)＋(a4×64)＋(a8×128)}
＋{(b×64)＋(b2×96)＋(b4×192)＋(b8×384)}
＋{(c×96)＋(c2×160)＋(c4×320)＋(c8×640)}
＋{(d×128)＋(d2×224)＋(d4×448)＋(d8×896)}]
≦8192</td></tr>
<tr><td>Condition 3</td><td>[{(a×4)＋(a2×8)＋(a4×16)＋(a8×32)}
＋{(b×8)＋(b2×16)＋(b4×32)＋(b8×64)}
＋{(c×12)＋(c2×24)＋(c4×48)＋(c8×96)}
＋{(d×16)＋(d2×32)＋(d4×64)＋(d8×128)}]
≦2048</td></tr>
<tr><td>Condition 4</td><td>{(16×A) + (54×B) + (88×C)} ≦ 2304</td><td>A: Number of remote I/O stations ≦ 64
B: Number of remote device stations (ME96 is applied) ≦ 42
C: Number of local stations, standby master stations and intelligent device stations ≦ 26</td></tr>
</table>


1 module for each system
Master station
QJ61BT11N
Terminal resistor (required)
Maximum 26
Local station
Local station
Local station
QJ61BT11N
QJ61BT11
A1SJ61QBT11
AJ61QBT11
A1SJ61BT11
AJ61BT11
CC-Link dedicated cable
Maximum 26
Maximum 42
Maximum 64
Intelligent device station
Remote device station
Remote I/O station
RS-232
Interface module
AJ65BT-R2(N)
ME96SSH-MB/SSR-MB
Remote I/O module
AJ65BTB1-16D
AJ65BTC-32D
Terminal resistor (required)
CC-Link dedicated cable
Total 64

4. Programming

4.1 Programming Procedure

Create a program which executes the “Monitoring of the measurement valus” by following the procedure below:


START
Parameter setting
Set the CPU parameter to start the data link.
(Refer to Section 5)
Required
Selecting Commands
Select the command to transmit to the ME96.
(Refer to Section 0)
In nesessary
Initial Communication
Initialize the ME96.
(Refer to Section 6.2)
Normal Communication
Transmit and receive the command to monitor the measurement value. (Refer to Section 6.4,Section 0)
Error Communication
Check the error status flag and error code.
(Rerer to Section 6.3, Section 7.2.6)
Required
Convert the data
Convert the measurement data using the effective range and multiplying factor. (Refer to Table 7.22)
In nesessary
End

5. Parameter Settings

5.1 Procedure from Parameter Settings to Data Link Startup

The following explains the procedure from setting the parameters to stating the data link.

5.1.1 CPU Parameter Area and Master Module Parameter Memory

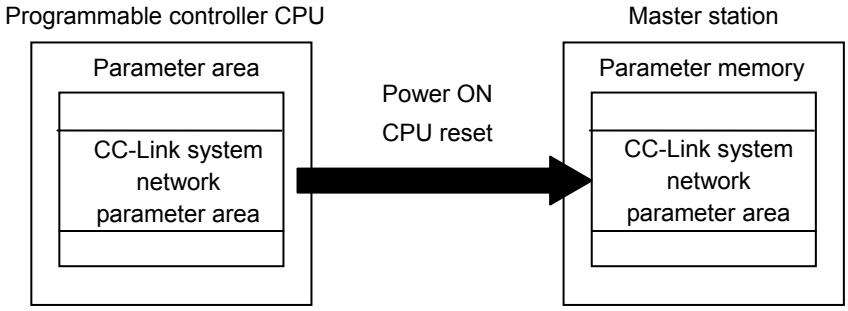
(1) CPU Parameter Area

This area is used to set the basic values for controlling the programmable controller system and the network parameters that control the CC-Link system.

(2) Master Station Parameter Memory

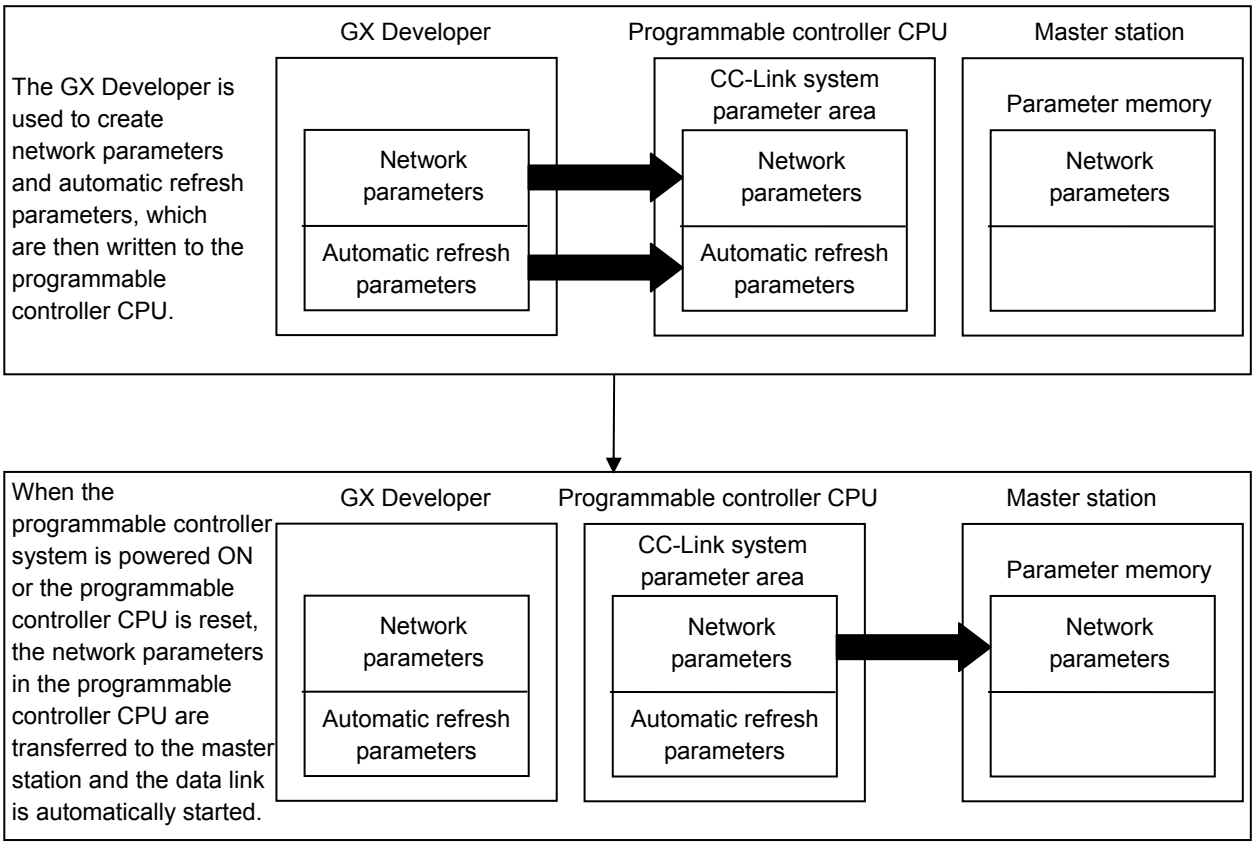
This area stores the network parameters for the CC-Link system.

When the module is powered OFF or the programmable controller CPU is reset, the network parameters are erased.



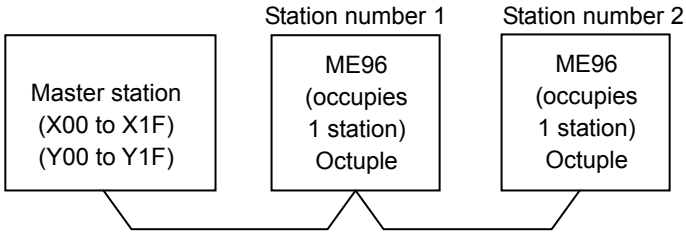
5.1.2 Procedure for Parameter Settings to Data Link Startup with GX Developer

Follow the procedure below for parameter settings to data link startup:


The GX Developer is used to create network parameters and automatic refresh parameters, which are then written to the programmable controller CPU.
GX Developer
Network parameters
Automatic refresh parameters
Programmable controller CPU
CC-Link system parameter area
Network parameters
Automatic refresh parameters
Master station
Parameter memory
Network parameters
When the programmable controller system is powered ON or the programmable controller CPU is reset, the network parameters in the programmable controller CPU are transferred to the master station and the data link is automatically started.
GX Developer
Network parameters
Automatic refresh parameters
Programmable controller CPU
CC-Link system parameter area
Network parameters
Automatic refresh parameters
Master station
Parameter memory
Network parameters

5.2 Example of Parameter Settings with GX Developer (Remote net ver.2 mode)

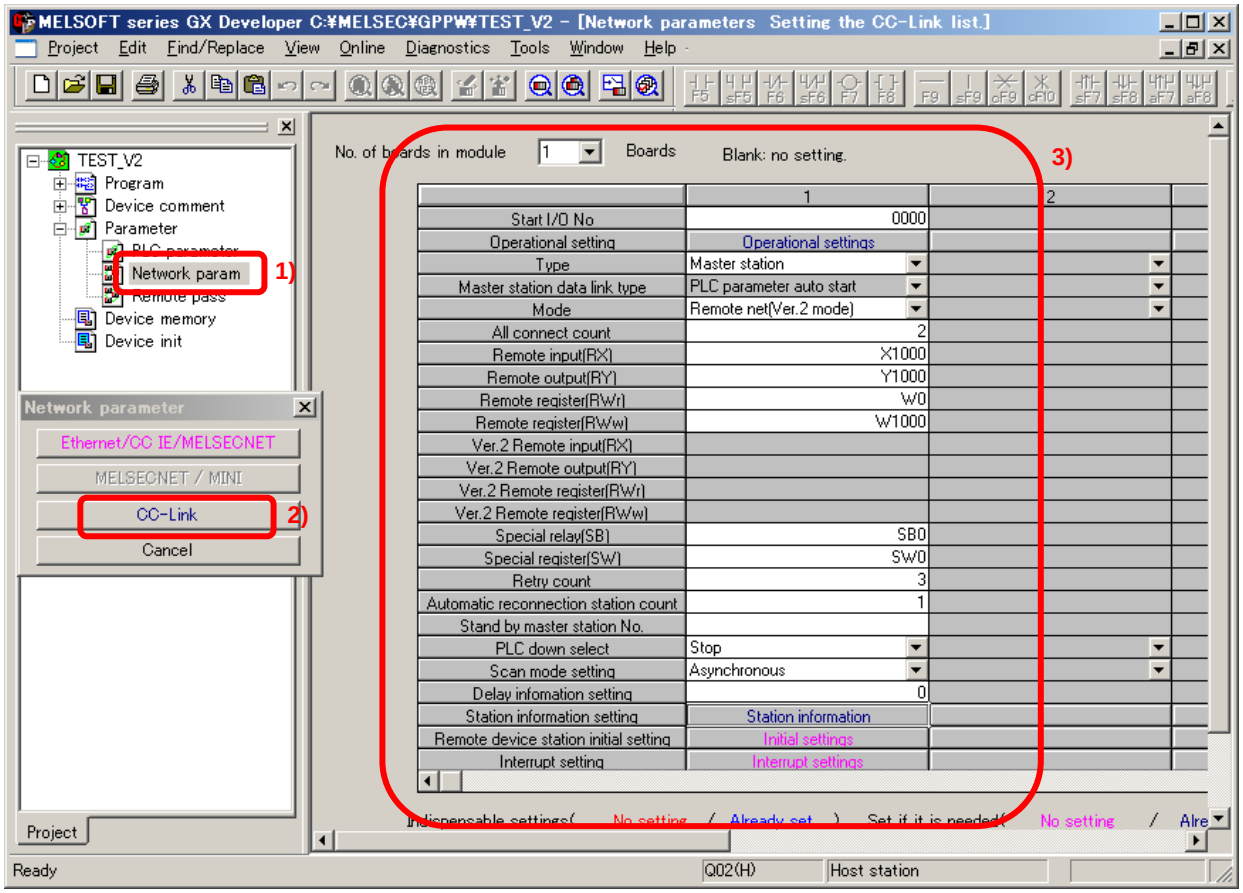
This section explains the parameter settings using the GX Developer. For more details on the GX Developer operation, refer to the GX Developer Operating Manual. The explanations in this section are based on the following example of the system configuration.



5.2.1 Master Station Network Parameter Settings

1) Double-click on the “Network param”.
2) Double-click on the “CC-Link” on the “Network parameter” screen.
3) Set the parameters as required.

The follwing describes an example of the parameter settings.



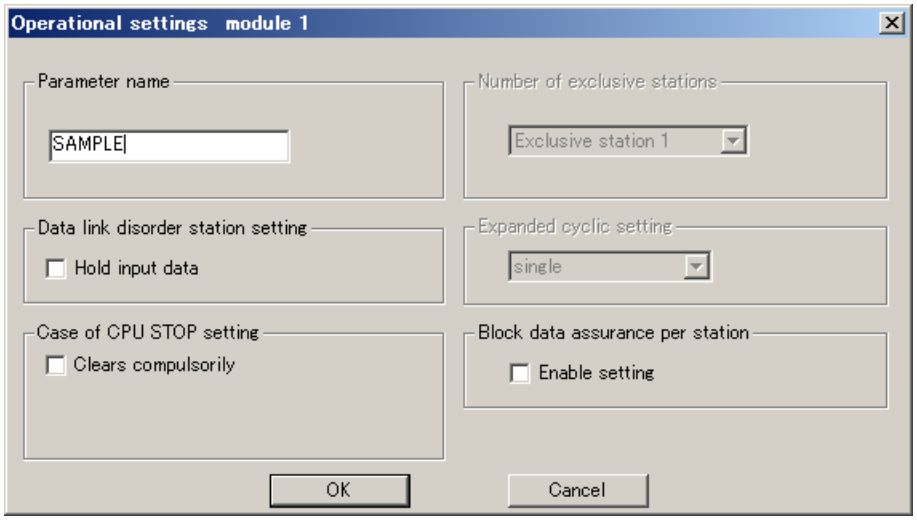
Setting Item	Description	Example for settings	Remarks
No.of boads in module	Set the "No. of boards in module " for which the network parameters are to be set.	1	
Start I/O No	Set the "Start I/O No." for the master station.	0000	
Operational settings	Set the following: ・Parameter name ・Data link err station setting ・Case of CPU Stop setting ・Block data assurance per station	Refer to next page.	Even if the Parameter name is not set, this will not affect the operation of the CC-Link system
Type	Set the station type.	Master station	
Mode	Set the CC-Link mode.	Remote net (Ver.2 mode)	
All connect count	Set the total number of connected stations in the CC-Link system including reserved stations.	2 (modules)	
Remote input (RX)	Set the remote input (RX) refresh device.	X1000	Device name - Select from X, M, L, B, D, W, R or ZR. Device number - Within the range of the device points that the CPU has.
Remote output (RY)	Set the remote output (RY) refresh device.	Y1000	Device name - Select from Y, M, L, B, T, C, ST, D, W, R or ZR. Device number - Within the range of the device points that the CPU has.
Remote register (RWr)	Set the remote register (RWr) refresh device.	W0	Device name - Select from M, L, B, D, W, R, or ZR. Device number - Within the range of the device points that the CPU has.
Remote register (RWw)	Set the remote register (RWw) refresh device.	W1000	Device name - Select from M, L, B, T, C, ST, D, W, R, or ZR. Device number - Within the range of the device points that the CPU has.
Special relay (SB)	Set the link special relay (SB) refresh device.	SB0	Device name - Select from M, L, B, D, W, R, SB or ZR. Device number - Within the range of the device points that the CPU has.
Special register (SW)	Set the link special register (SW) refresh device.	SW0	Device name - Select from M, L, B, D, W, R, SW or ZR. Device number - Within the range of the device points that the CPU has.
Retry count	Set the number of retries for "Retry count", when a communication error occurs.	3	
Automatic reconnection station count	Set the number of modules that can return to system operation by a single link scan.	1	
Standby master station No.	Set the station number for the standby master station	Blank	Blank: No standby master station specified.
PLC down select	Set the data link status for "PLC down select", when a master station programmable controller CPU error occurs.	Stop	
Scan mode setting	Set whether the link scan for the sequence scan is synchronous or asynchronous.	Asynchronous	
Delay information setting	Set for the link scan delay time.	0	
Station information settings	Set the station data.	Refer to the next page.	

POINT

(1) For the automatic refresh parameter setting, set the start device only. Devices are automatically assigned until the last station number including reserved stations and occupied stations.
In the example of the system configuration in this section, the last station number is "2". Therefore, total of remote I/O points is 256 points (128 x 2 = 256) and total of remote registers points is 64 points (32 x 2 = 64). If refresh device of remote input (RX) is set to "X1000" and that of remote registers (RWr) is set to "W0", the end devices will be "X10FF" and "W3F" respectively.

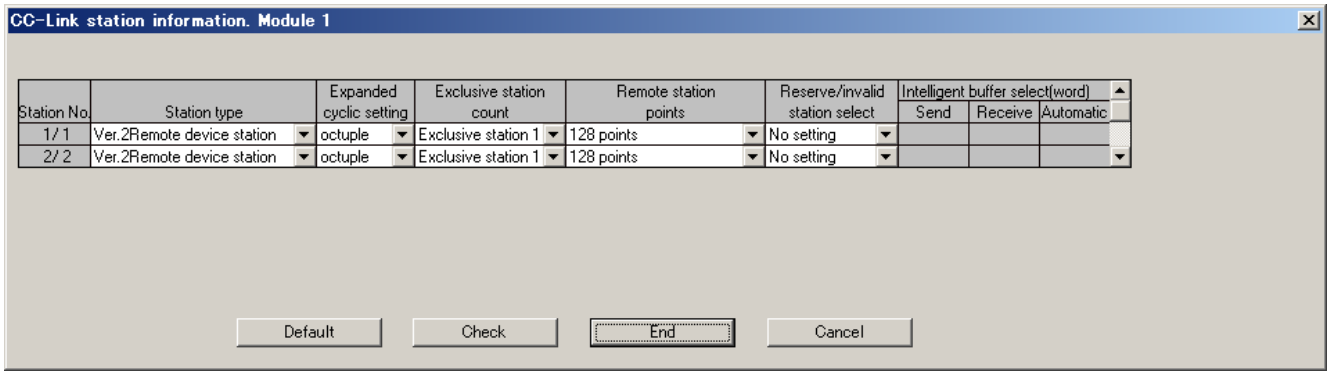
(2) When setting X, Y, B, W, SB and SW as refresh devices, make setting so that they do not overlap with the device numbers used on the other networks, etc.

《Example for Operational settings》



Setting Item	Description	Example for settings	Remarks
Parameter name	Set the Parameter name.	“SAMPLE”	Even if the Parameter name is not set, this will not affect the operation of the CC-Link system
Data link disorder satation setting	Set the input status for the data link error station.	Clear ("Hold input data" not checked)	
Case of CPU Stop setting	Set the slave station refresh/compulsory clear setting at programmable controller CPU STOP.	Refresh ("Clears compulsorily " not checked)	
Block data assurance per station	Set the block guarantee of cyclic data per station.	Disable ("Enable setting" not checked)	

《Example for Station information settings》



Setting Item	Description	Example for settings	Remarks
Station type	Set the station data.	Ver2. Remote device station	Set the “ver2.00” in Setting Menu 7 of ME96.
Expanded cyclic setting		octuple	ME96 cannot use other than “octuple”.
Number of occupied stations *		Occupies 1 station	Set the “Occupies 1 station” in case of the ME96.
Remote station points		128 points	Set the “128 points” in case of the ME96.
Reserved/invalid station select		No setting	

* "Number of exclusive stations" on the screen is described as "Number of occupied stations" in this manual.
"Exclusive station 1" on the screen is described as "Occupies 1 station" in this manual

6. Communication Between the Master Station and ME96

6.1 Communication Guideline

There are three communication statuses (Initial Communication, Normal Communication, Error Communication) between the Master station and ME96.
In the normal communication, alarm status and digital input status of ME96 can be monitored using bit data (remote input RX). Furthermore, the following can be performed by using remote input, remote output and remote registers.

- Monitoring by Pattern
- Monitoring by Command(1H).
- Setting by Command(2H).

For a monitoring by pattern, some measuring values can be monitored by selecting a bit of RY. Measuring values which can be monitored have been already grouping in ME96 in advance. Please select the necessary group in a bit of RY.

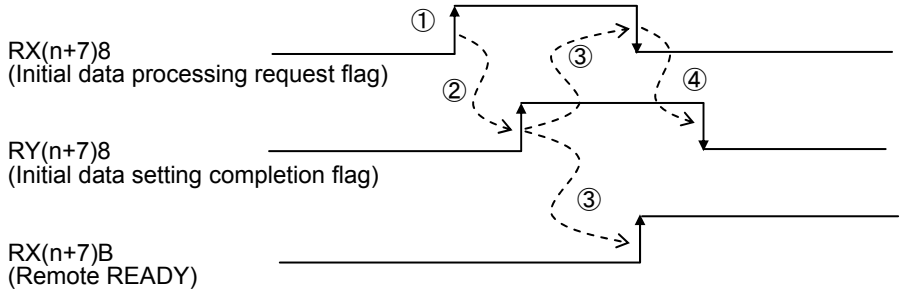
For a monitoring by command(1H), you can select any measurement items to be monitored. ME96 has unique codes (called unit No., group No. and channel No.) for each measurement items. You can monitor the selected measurement items by writing these codes to the remote registers.

For a setting by command(2H), you can set for ME96 settings.

* All measuring items can be monitored even when it is not displayed in ME96.

6.2 Initial Communication

Initial communication is performed at the beginning after the power supply is turned on or hardware is reset. Refer to section 7.1 about the remote input RX and the remote output RY.



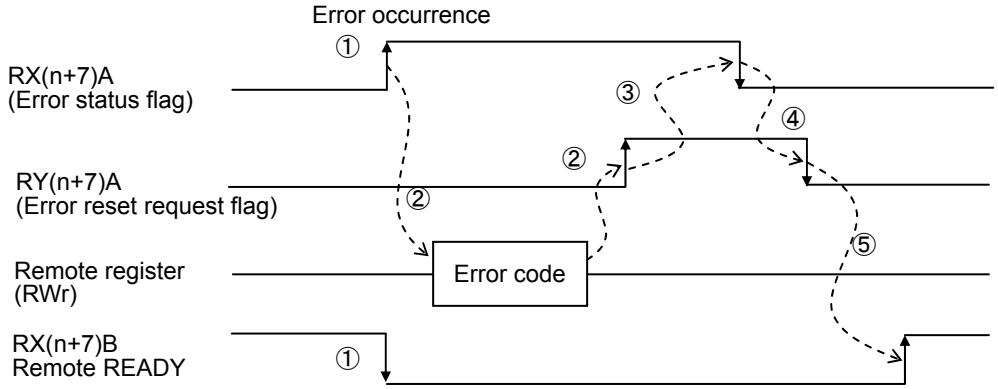
①After the power supply is turned on, or hardware is reset, the initial data processing request flag is turned on by ME96.

②After the initial data processing request flag is turned on, turn on the initial data setting completion flag.

③After the initial data setting completion flag is turned on, the initial data processing request flag is turned off and the remote READY is turned on.

④After the initial data processing request flag is turned off, turned off the initial data setting completion flag.

6.3 Error Communication



①When an error occurs in ME96, error status flag is turned on and the remote READY is turned off.

②When the error status flag is turned on, read the error code from the remote register RWr. Eliminate the cause of the error while referring to the red error code. When resuming communication with ME96, turn on the error reset request flag.

③After the error reset request flag is turned on, the error status flag is turned off.

④After the error status flag is turned off, turn off the error reset request flag.

⑤After the error reset request flag is turned off, the remote READY is turned on and normal communication is resumed.

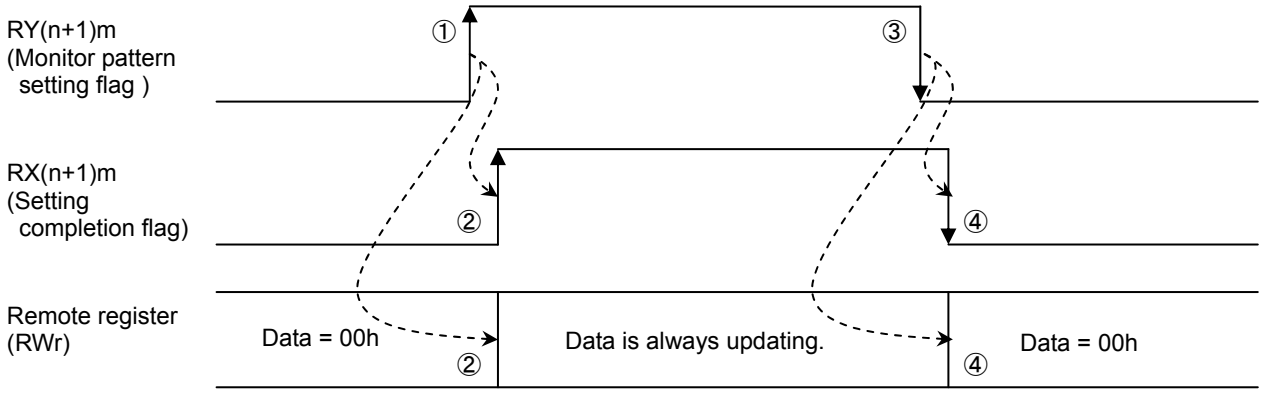
Note: Refer to “7.2.6 About error occurrence” for error code.

6.4 Normal Communication

After initial data processing is complete, allows the monitoring by pattern, monitoring by command(1H) and setting by command(2H).

6.4.1 Monitoring by Pattern

Up to 16 mesuring values can be monitored by setting a bit of RY. Measuring values which can be monitored have been already grouping in ME96 in advance. Therefore, select the necessary group in a bit of RY. (Refer to section 7.1.2)



(1) Start of monitor

①Turns on monitor pattern setting flag(RY(n+1)m) which will be monitored.

②Corresponding setting completion flag(RX(n+1)m) is turned on when the measuring values can be monitored at ME96. At this time, Measuring values are stored in remote registers(RWr) each time the measuring data of ME96 is updating.

(2) End of monitor

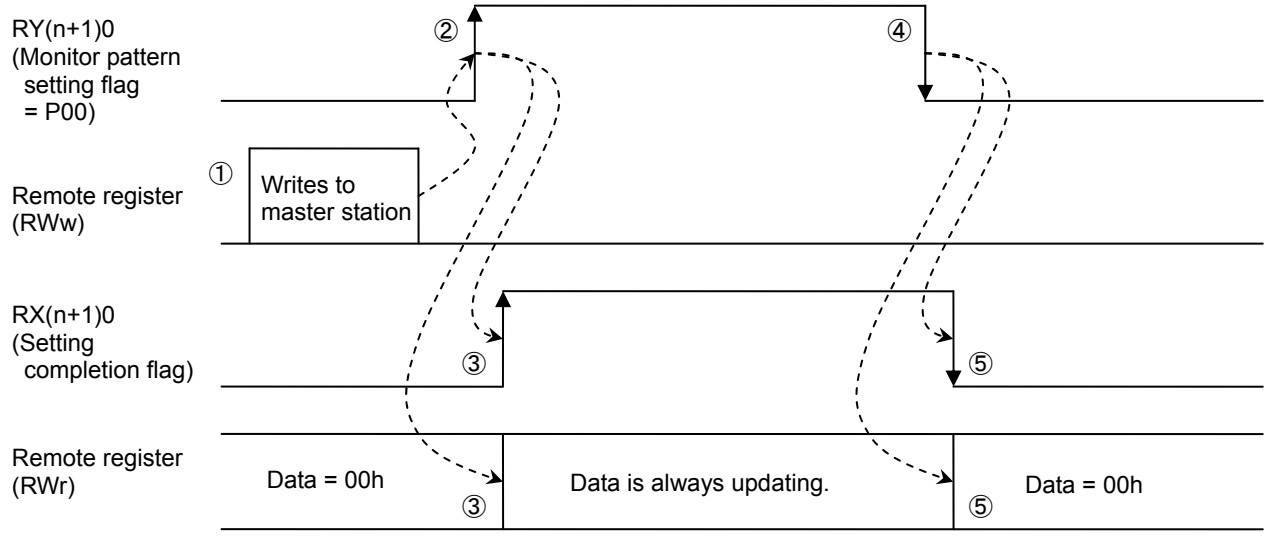
③Turns off monitor pattern setting flag(RY(n+1)m).

④Corresponding setting completion flag(RX(n+1)m) is turned off and remote registers are 00h.

Note: When turns on multiple monitor pattern setting flag(RY(n+1)*), setting completion flag is not turned on. At this time, error status flag(RX(n+7)A) is turned on, and remote READY(RX(n+7)B) is turned off.

6.4.2 Monitoring by Command(1H)

Up to 8 measuring values can be monitored by setting the unique codes (called unit No., group No. and channel No.).



(1) Start of monitor

①Writes the Unit No., group No and channel No. for measuring items to be monitored to remote registers(RWw).

②Turns on monitor pattern setting flag(RY(n+1)0).

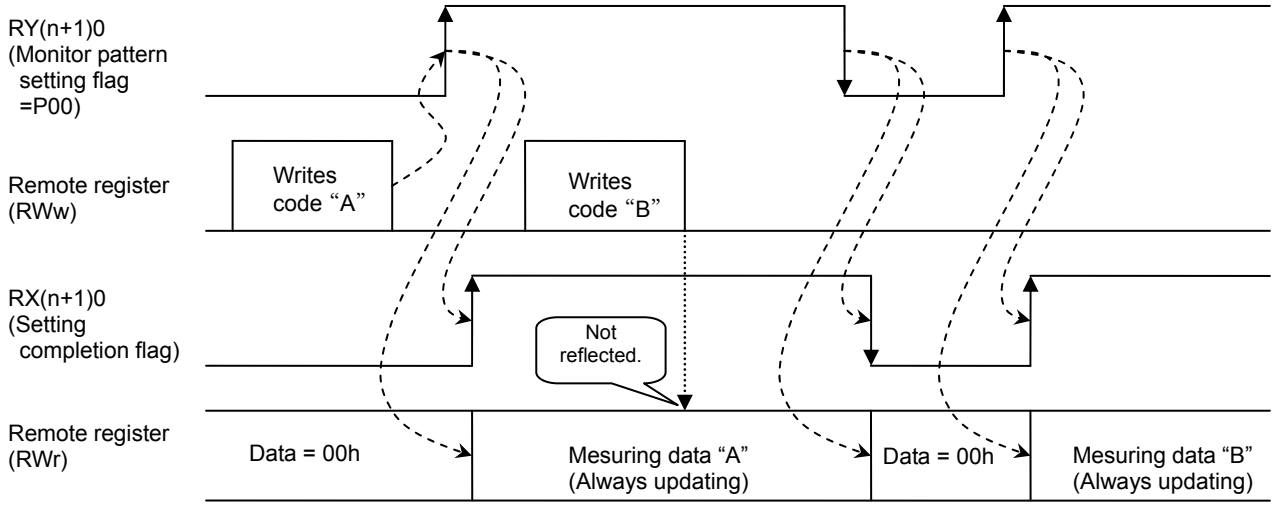
③When the measuring values can be monitored with ME96, corresponding setting completion flag(RX(n+1)0) is turned on. At this time, Measuring values are stored in remote registers(RWr) each time the measuring data of ME96 is updating.

(2) End of monitor

④Turns off monitor pattern setting flag(RY(n+1)0).

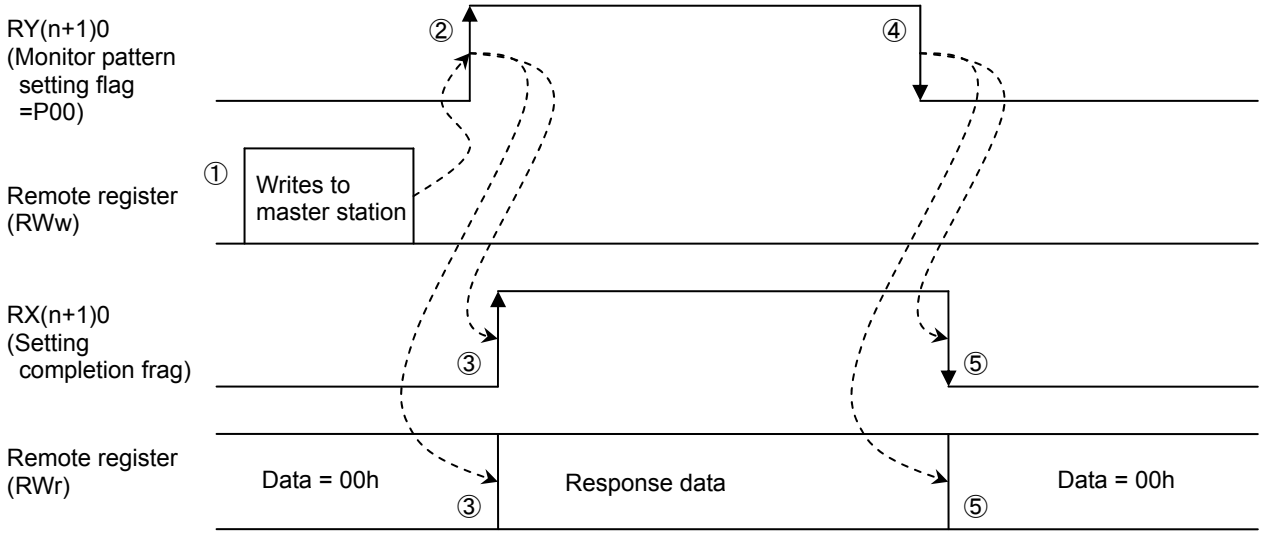
⑤Corresponding setting completion flag(RX(n+1)m) is turned off and remote registers are 00h.

Note: When monitor pattern setting flag(RY(n+1)0) remains on, measuring items in remote registers(RWr) is not reflected if remote registers(RWw) is changed. To change measuring items, turns on monitor pattern setting flag(RY(n+1)0) after changing remote registers(RWw).



6.4.3 Setting by Command(2H)

A setting item of ME96 can be set by setting the unique codes (called unit No., group No. and channel No.) and setting data.



(1) Setting

①Writes the Unit No., group No, channel No. and setting data to remote registers(RWw).

②Turns on monitor pattern setting flag(RY(n+1)0).

③After checking for data at ME96, corresponding setting completion flag(RX(n+1)0) is turned on. At this time, response data are stored in remote registers(RWr).

(2) End of setting

④Turns off monitor pattern setting flag(RY(n+1)0).

⑤Corresponding setting completion flag(RX(n+1)m) is turned off and remote registers are 00h.

Note: When monitor pattern setting flag(RY(n+1)0) remains on, setting data of ME96 is not reflected if remote registers(RWw) is changed. To change setting data, turns on monitor pattern setting flag(RY(n+1)0) after writing remote registers(RWw).

7. Remote I/O and Remote Register

7.1 Remote Input RX, Remote Output RY

The remote input RX and remote output RY are used to communicate for bit data between the master station and ME96.

7.1.1 Remote input RX

The allocation of the remote input RX of ME96 is shown in the table below.

Device No.	Signal name	ME96 SSR	ME96 SSH	Description		Note
				OFF(0)	ON(1)	
RXn0	Digital Input 1 (DI1)	○	○	—	—	
RXn1	Digital Input 2 (DI2)	○	○	—	—	
RXn2	Digital Input 3 (DI3)	○	○	Non-Alarm state	Alarm state	
RXn3	Digital Input 4 (DI4)	○	○	Non-Alarm state	Alarm state	
RXn4	Reserved	—	—	OFF	ON	
RXn5	Alarm (Total)	○	○	Non-Alarm state	Alarm state	
RXn6	Alarm of Current Demand	○	○	OFF	ON	*2
RXn7	Alarm of Active power Demand	—	○	OFF	ON	*2
RXn8	Alarm of Voltage	○	○	Non-Alarm state	Alarm state	*2
RXn9	Alarm of Current	○	○	Non-Alarm state	Alarm state	*2
RXnA	Alarm of Active power	○	○	Non-Alarm state	Alarm state	*2
RXnB	Alarm of Reactive power	○	○	Non-Alarm state	Alarm state	*2
RXnC	Alarm of Frequency	○	○	Non-Alarm state	Alarm state	*2
RXnD	Alarm of Power factor	○	○	Non-Alarm state	Alarm state	*2
RXnE	Alarm of T.H.D (Voltage)	○	○	Non-Alarm state	Alarm state	*2
RXnF	Alarm of harmonic current	○	○	Non-Alarm state	Alarm state	*2
RX(n+1)0	Setting completion flag P00	○	○	Not receiving	Receiving	
RX(n+1)1 to RX(n+1)7	Reserved	—	—	—	—	
RX(n+1)8	Setting completion flag P08	○	○	Not receiving	Receiving	
RX(n+1)9	Setting completion flag P09	○	○	Not receiving	Receiving	
RX(n+1)A	Setting completion flag P10	○	○	Not receiving	Receiving	
RX(n+1)B	Setting completion flag P11	○	○	Not receiving	Receiving	
RX(n+1)C	Setting completion flag P12	○	○	Not receiving	Receiving	
RX(n+1)D to RX(n+7)7	Reserved	—	—	—	—	
RX(n+7)8	Initial data processing request flag	○	○	Power OFF, remote READY ON, or error status flag ON	Power supply is turned ON or hardware reset	*1
RX(n+7)9	Reserved	—	—	—	—	
RX(n+7)A	Error status flag	○	○	No error occurrence	Error occurrence	*1
RX(n+7)B	Remote READY	○	○	Monitoring or setting are not possible	Normally communication status	*1
RX(n+7)C to RX(n+7)F	Reserved	—	—	—	—	

*1: For the details, refer to “6.Communication Between the Master Station and ME96”

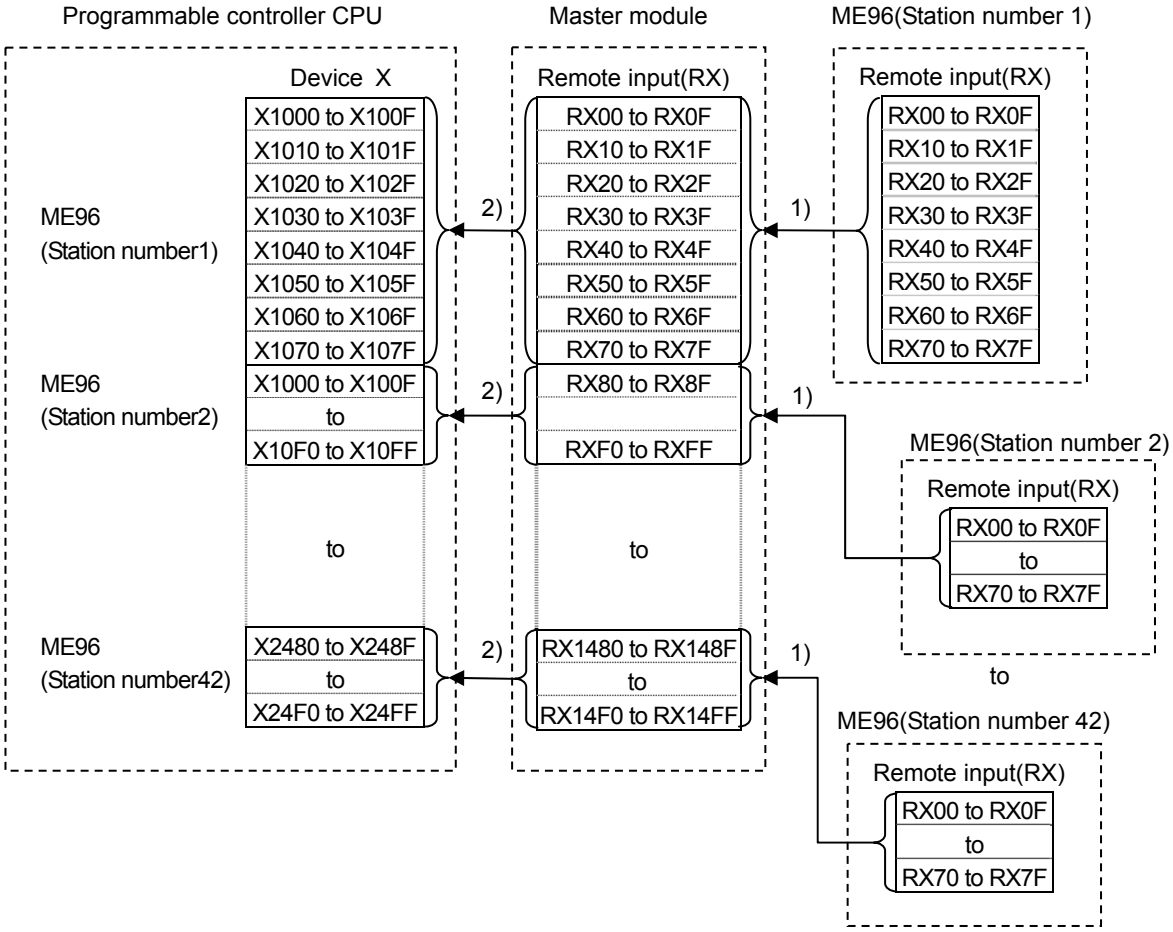
*2: “ON(1)” shows the state where the upper limit or the lower limit is exceeded.

Note: “n” in the table is determined by the station number of ME96.

(1) Relationships between programmable controller CPU, master module and ME96(RX)

1) The input status of ME96 is stored automatically (for each link scan) in the master station's "remote input RX" buffer memory.

2) The input status stored in the "remote input RX" buffer memory is stored in the CPU device set with the automatic refresh parameters.



Station number	Device No.			Station number	Device No.			Station number	Device No.		
1	X1000	to	X107F	15	X1700	to	X177F	29	X1E00	to	X1E7F
2	X1080	to	X10FF	16	X1780	to	X17FF	30	X1E80	to	X1EFF
3	X1100	to	X117F	17	X1800	to	X187F	31	X1F00	to	X1F7F
4	X1180	to	X11FF	18	X1880	to	X18FF	32	X1F80	to	X1FFF
5	X1200	to	X127F	19	X1900	to	X197F	33	X2000	to	X207F
6	X1280	to	X12FF	20	X1980	to	X19FF	34	X2080	to	X20FF
7	X1300	to	X137F	21	X1A00	to	X1A7F	35	X2100	to	X217F
8	X1380	to	X13FF	22	X1A80	to	X1AFF	36	X2180	to	X21FF
9	X1400	to	X147F	23	X1B00	to	X1B7F	37	X2200	to	X227F
10	X1480	to	X14FF	24	X1B80	to	X1BFF	38	X2280	to	X22FF
11	X1500	to	X157F	25	X1C00	to	X1C7F	39	X2300	to	X237F
12	X1580	to	X15FF	26	X1C80	to	X1CFF	40	X2380	to	X23FF
13	X1600	to	X167F	27	X1D00	to	X1D7F	41	X2400	to	X247F
14	X1680	to	X16FF	28	X1D80	to	X1DFF	42	X2480	to	X24FF

Device No. is determined to “X1000 to X24FF” if refresh device of remote input (RX) is set to “X1000”.

7.1.2 Remote Output RY

The allocation of the remote output RY of ME96 is shown in the table below.

Device No.	Signal name	Description		Note
		ON (1) → OFF (0)	OFF (0) → ON (1)	
RYn0 to RYnF	Reserved	—	—	
RY(n+1)0	Monitor pattern setting flag P00	Not setting	Setting	
RY(n+1)1 to RY(n+1)7	Reserved	—	—	
RY(n+1)8	Monitor pattern setting flag P08	Not setting	Setting	
RY(n+1)9	Monitor pattern setting flag P09	Not setting	Setting	
RY(n+1)A	Monitor pattern setting flag P10	Not setting	Setting	
RY(n+1)B	Monitor pattern setting flag P11	Not setting	Setting	
RY(n+1)C	Monitor pattern setting flag P12	Not setting	Setting	
RY(n+1)D to RY(n+7)7	Reserved	—	—	
RY(n+7)8	Initial data setting completion flag	Cancel normal communication request	Normal communication request	*1
RY(n+7)9	Unusable	—	—	
RY(n+7)A	Error reset request flag	Cancel error reset request	Error reset request	*1
RY(n+7)B to RY(n+7)F	Unusable	—	—	

*1: For the details, refet to “6.Communication Between the Master Station and ME96”

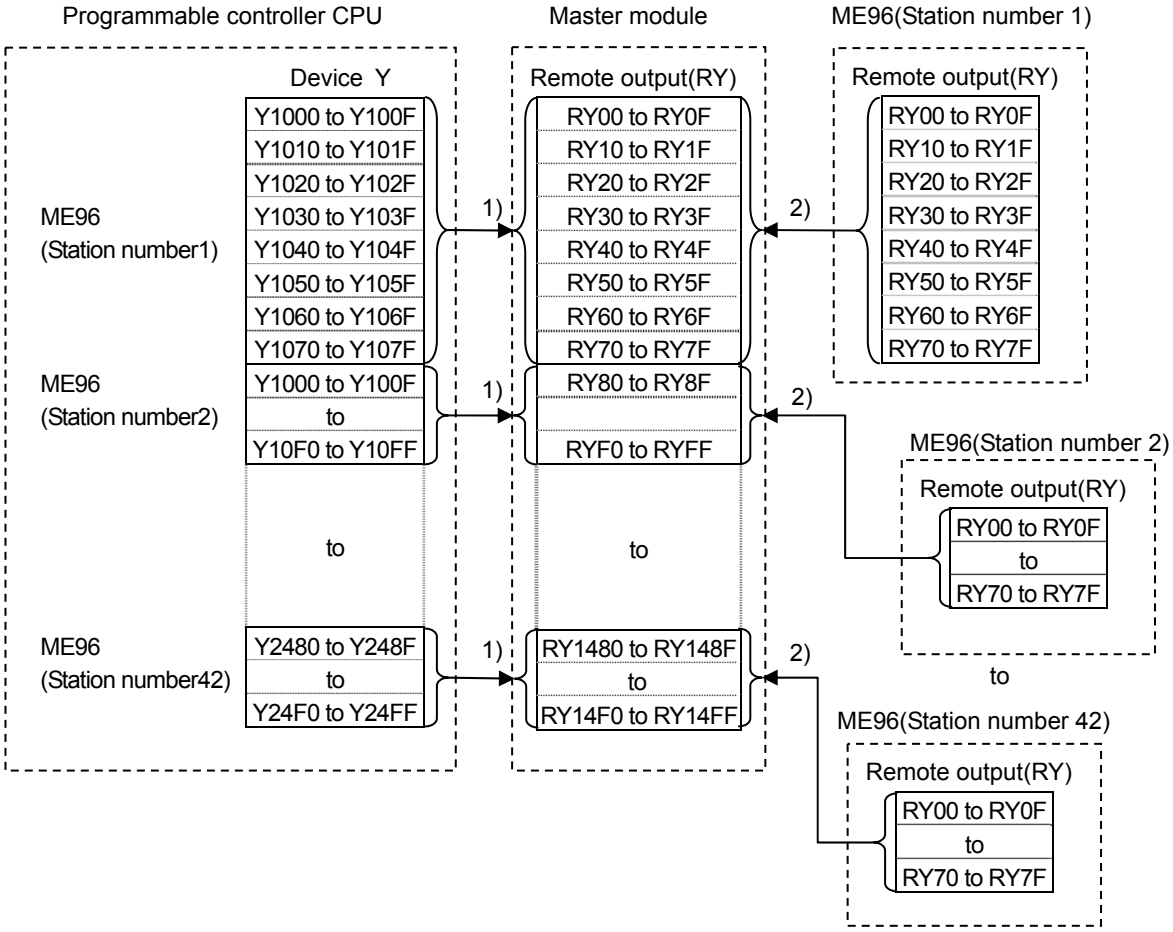
Note: The “n” in the table is determined by the station number of ME96.

Point
Do not read or write to reserved remote registers. If reading or writing is performed, the functions of ME96 are not guaranteed.

(1) Relationships between programmable controller CPU, master module and ME96(RY)

1) The on/off data of the CPU device set with the automatic refresh parameters is stored in the "remote output RY" buffer memory.

2) Remote output RY is automatically set to on/off (for each link scan) according to the output status stored in the "remote output RY" buffer memory.



Station number	Device No.			Station number	Device No.			Station number	Device No.		
1	Y1000	to	Y107F	15	Y1700	to	Y177F	29	Y1E00	to	Y1E7F
2	Y1080	to	Y10FF	16	Y1780	to	Y17FF	30	Y1E80	to	Y1EFF
3	Y1100	to	Y117F	17	Y1800	to	Y187F	31	Y1F00	to	Y1F7F
4	Y1180	to	Y11FF	18	Y1880	to	Y18FF	32	Y1F80	to	Y1FFF
5	Y1200	to	Y127F	19	Y1900	to	Y197F	33	Y2000	to	Y207F
6	Y1280	to	Y12FF	20	Y1980	to	Y19FF	34	Y2080	to	Y20FF
7	Y1300	to	Y137F	21	Y1A00	to	Y1A7F	35	Y2100	to	Y217F
8	Y1380	to	Y13FF	22	Y1A80	to	Y1AFF	36	Y2180	to	Y21FF
9	Y1400	to	Y147F	23	Y1B00	to	Y1B7F	37	Y2200	to	Y227F
10	Y1480	to	Y14FF	24	Y1B80	to	Y1BFF	38	Y2280	to	Y22FF
11	Y1500	to	Y157F	25	Y1C00	to	Y1C7F	39	Y2300	to	Y237F
12	Y1580	to	Y15FF	26	Y1C80	to	Y1CFF	40	Y2380	to	Y23FF
13	Y1600	to	Y167F	27	Y1D00	to	Y1D7F	41	Y2400	to	Y247F
14	Y1680	to	Y16FF	28	Y1D80	to	Y1DFF	42	Y2480	to	Y24FF

Device No. is determined to “Y1000 to Y24FF” if refresh device of remote output (RY) is set to “Y1000”.

7.2 Remote Register (RWr, RWw)

The remote registers RWr and RWw are used to communicate word data between the master station and ME96. Because it occupiers 1 station(Expanded cyclic setting: octuple), the remote registers RWr and RWw each have 32 words in length.

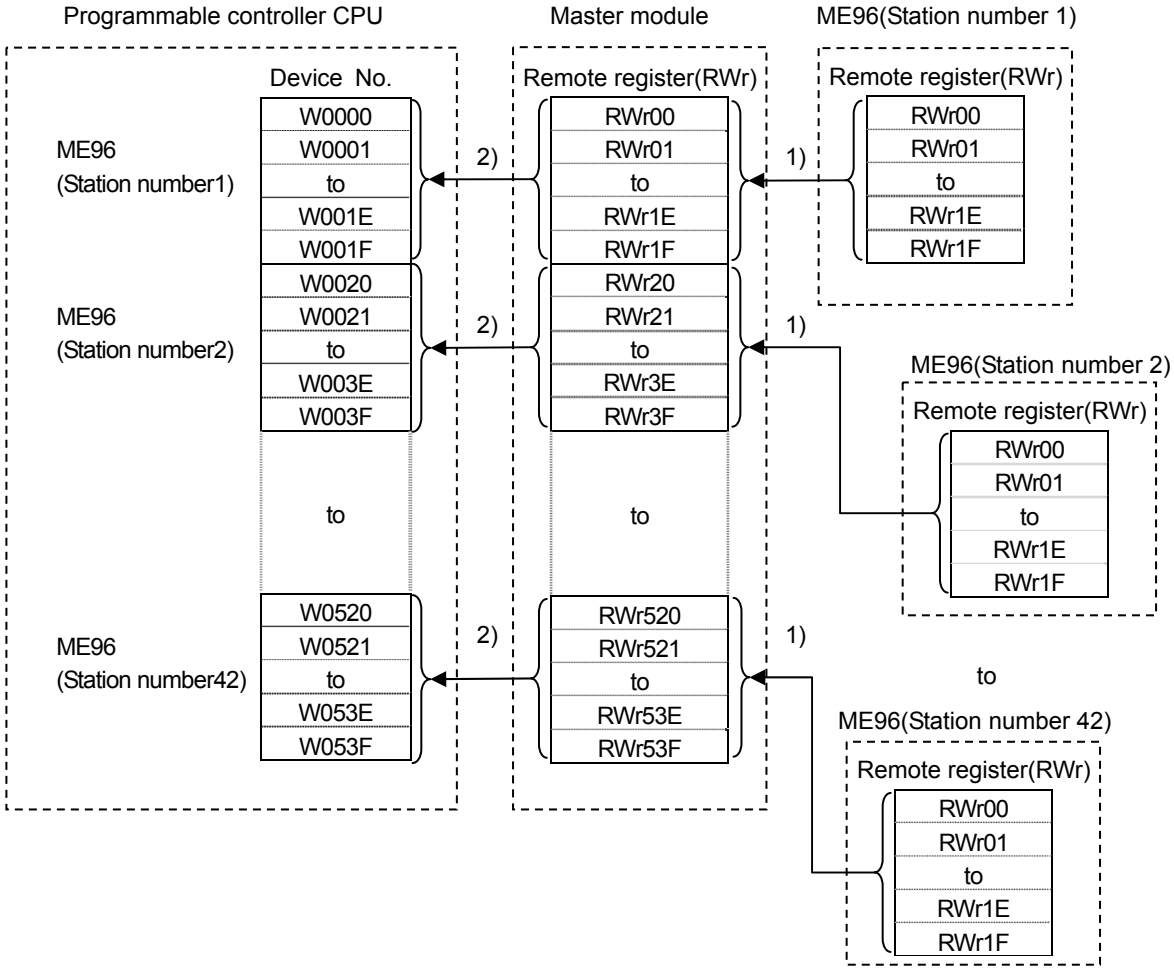
For monitoring by pattern, it is not necessary to use remote registers(RWw). Selected measuring values which are set a bit of RY are stored in remote registers(RWr).

For monitoring by command(1H) and setting by command(2H), it is necessary to use remote registers(RWw). ME96 has unique codes (called unit No., group No. and channel No.) for each measurement items and setting items. It becomes possible to monitor each measurement values or set each parameters by writing into the remote registers(RWw) of the master station command and the related data allocated to the item you want to monitor or set.

(1) Relationships between programmable controller CPU, master module and ME96(RWr)

1) The remote registers RWr data of a remote device station is automatically stored in the "remote registers Rwr" buffer memory of the master station.

2) The remote registers RWr data of ME96 stored in the "remote registers RWr" buffer memory is stored in the CPU device set with the automatic refresh parameters.



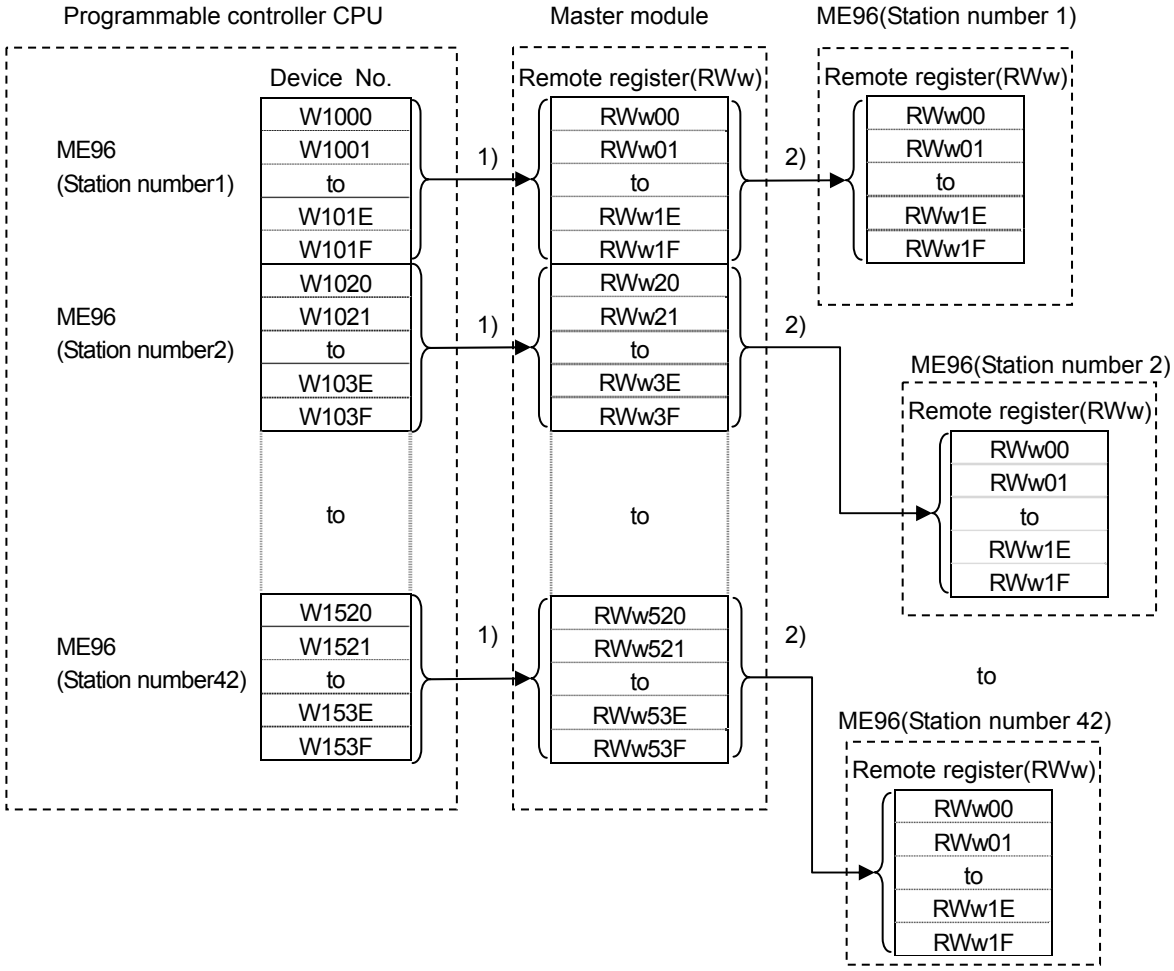
Station number	Device No.			Station number	Device No.			Station number	Device No.		
1	W0000	to	W001F	15	W01C0	to	W01DF	29	W0380	to	W039F
2	W0020	to	W003F	16	W01E0	to	W01FF	30	W03A0	to	W03BF
3	W0040	to	W005F	17	W0200	to	W021F	31	W03C0	to	W03DF
4	W0060	to	W007F	18	W0220	to	W023F	32	W03E0	to	W03FF
5	W0080	to	W009F	19	W0240	to	W025F	33	W0400	to	W041F
6	W00A0	to	W00BF	20	W0260	to	W027F	34	W0420	to	W043F
7	W00C0	to	W00DF	21	W0280	to	W029F	35	W0440	to	W045F
8	W00E0	to	W00FF	22	W02A0	to	W02BF	36	W0460	to	W047F
9	W0100	to	W011F	23	W02C0	to	W02DF	37	W0480	to	W049F
10	W0120	to	W013F	24	W02E0	to	W02FF	38	W04A0	to	W04BF
11	W0140	to	W015F	25	W0300	to	W031F	39	W04C0	to	W04DF
12	W0160	to	W017F	26	W0320	to	W033F	40	W04E0	to	W04FF
13	W0180	to	W019F	27	W0340	to	W035F	41	W0500	to	W051F
14	W01A0	to	W01BF	28	W0360	to	W037F	42	W0520	to	W053F

Device No. is determined to “W0000 to W053F” if refresh device of remote registers (RWr) is set to “W0”.

(2) Relationships between programmable controller CPU, master module and ME96(RWw)

1) The transmission data of the CPU device set with the automatic refresh parameters is stored in the "remote registers RWw" buffer memory.

2) The data stored in the "remote registers RWw" buffer memory is automatically sent to the remote registers RWw of each remote device station.



Station number	Device No.			Station number	Device No.			Station number	Device No.		
1	W1000	to	W101F	15	W11C0	to	W11DF	29	W1380	to	W139F
2	W1020	to	W103F	16	W11E0	to	W11FF	30	W13A0	to	W13BF
3	W1040	to	W105F	17	W1200	to	W121F	31	W13C0	to	W13DF
4	W1060	to	W107F	18	W1220	to	W123F	32	W13E0	to	W13FF
5	W1080	to	W109F	19	W1240	to	W125F	33	W1400	to	W141F
6	W10A0	to	W10BF	20	W1260	to	W127F	34	W1420	to	W143F
7	W10C0	to	W10DF	21	W1280	to	W129F	35	W1440	to	W145F
8	W10E0	to	W10FF	22	W12A0	to	W12BF	36	W1460	to	W147F
9	W1100	to	W111F	23	W12C0	to	W12DF	37	W1480	to	W149F
10	W1120	to	W113F	24	W12E0	to	W12FF	38	W14A0	to	W14BF
11	W1140	to	W115F	25	W1300	to	W131F	39	W14C0	to	W14DF
12	W1160	to	W117F	26	W1320	to	W133F	40	W14E0	to	W14FF
13	W1180	to	W119F	27	W1340	to	W135F	41	W1500	to	W151F
14	W11A0	to	W11BF	28	W1360	to	W137F	42	W1520	to	W153F

Device No. is determined to “W1000 to W153F” if refresh device of remote registers (RWw) is set to “W1000”.

7.2.1 When Monitoring by Pattern

The following table shows correspondence between RY and grouped measuring items.

Table 7.1 Correspondence between RY and grouped measuring items

device.	P08	P09	P10	P11	P12
	RY(n+1)8	RY(n+1)9	RY(n+1)A	RY(n+1)B	RY(n+1)C
RWr00	Phase 1 current (Inst.)[A]	Phase 1 current demand (Inst.)[A]	Phase N current (Inst.)[A]	Phase 1 current (Inst.)[A]	Phase N current (Inst.)[A]
RWr01					
RWr02				Phase 2 current (Inst.)[A]	Phase N current demand (Inst.)[A]
RWr03					
RWr04	Phase 2 current (Inst.)[A]	Phase 2 current demand (Inst.)[A]	Phase N current demand (Inst.)[A]	Phase 3 current (Inst.)[A]	1-N Voltage (Inst.)[V]
RWr05					
RWr06				Phase 1 current demand (Inst.)[A]	2-N Voltage (Inst.)[V]
RWr07					
RWr08	Phase 3 current (Inst.)[A]	Phase 3 current demand (Inst.)[A]	1-N Voltage (Inst.)[V]	Phase 2 current demand (Inst.)[A]	3-N Voltage (Inst.)[V]
RWr09					
RWr0A				Phase 3 current demand (Inst.)[A]	Average current (Inst.)[A]
RWr0B					
RWr0C	1-2 Voltage (Inst.)[V]	Total rolling demand (Inst.)[kW] *1	2-N Voltage (Inst.)[V]	1-2 Voltage (Inst.)[V]	Avrage current demand (Inst.)[A]
RWr0D					
RWr0E				2-3 Voltage (Inst.)[V]	Average L-L voltage (Inst.)[V]
RWr0F					
RWr10	2-3 Voltage (Inst.)[V]	Total power factor (Inst.)[%]	3-N Voltage (Inst.)[V]	3-1 Voltage (Inst.)[V]	Average L-N voltage (Inst.)[V]
RWr11					
RWr12				Total active power (Inst.)[kW]	00h (No items)
RWr13					
RWr14	3-1 Voltage (Inst.)[V]	Frequency (Inst.)[Hz]	00h (No items)	Total rolling demand (Inst.)[kW] *1	00h (No items)
RWr15					
RWr16				Total reactive power (Inst.)[kvar]	00h (No items)
RWr17					
RWr18	Total active power (Inst.)[kW]	Total reactive power (Inst.)[kvar]	00h (No items)	Total power factor (Inst.)[%]	00h (No items)
RWr19					
RWr1A				Frequency (Inst.)[Hz]	00h (No items)
RWr1B					
RWr1C	Active energy import[kWh]	Reactive energy import lag [kvarh]	00h (No items)	Active energy import[kWh]	00h (No items)
RWr1D					
RWr1E				Reactive energy import lag [kvarh]	00h (No items)
RWr1F					
Group format	①	①	①	②	②

Inst.: Instantaneous value

*1: ME96SSH-MB Only.

Note: “[ ]” in the above table indicate the unit of measuring items.

Note: P10 and P12 can be used for 3P4W only. In others, the error will occur.

Note: For the active power (demand) and reactive power, ±1638.3MW(Mvar) becomes the upper(lower) value.

Note: For the power factor, “+” is showed lag, “-“ is showed lead as with ME96’s display.

Note: Measurement data correspond as follows according to setting of phase wiring.

Name of channel	Phase wiring			
	3P3W	1P3W(1N3)	1P3W(1N2)	1P2W
1-2 voltage	1-2 voltage	1-N voltage	1-N voltage	Voltage
2-3 voltage	2-3 voltage	3-N voltage	2-N voltage	-
3-1 voltage	3-1 voltage	1-3 voltage	1-3 voltage	-
Phase 1 current	Phase 1 current	Phase 1 current	Phase 1 current	Current
Phase 2 current	Phase 2 current	Phase N current	Phase N current	-
Phase 3 current	Phase 3 current	Phase 3 current	Phase 2 current	-

(1) Group format ①

For group format ①, Up to 8 measuring items can be monitored per a group. Measuring items are expressed in 4 words.

Group format ①

	b15 b8	b7 b0
RWr00	Channel No.	Group No.
RWr01	Index number	00h
RWr02	Low data	
RWr03	High data	
RWr04	Channel No.	Group No.
RWr05	Index number	00h
RWr06	Low data	
RWr07	High data	
RWr08	Channel No.	Group No.
RWr09	Index number	00h
RWr0A	Low data	
RWr0B	High data	
RWr0C	Channel No.	Group No.
RWr0D	Index number	00h
RWr0E	Low data	
RWr0F	High data	
RWr10	Channel No.	Group No.
RWr11	Index number	00h
RWr12	Low data	
RWr13	High data	
RWr14	Channel No.	Group No.
RWr15	Index number	00h
RWr16	Low data	
RWr17	High data	
RWr18	Channel No.	Group No.
RWr19	Index number	00h
RWr1A	Low data	
RWr1B	High data	
RWr1C	Channel No.	Group No.
RWr1D	Index number	00h
RWr1E	Low data	
RWr1F	High data	

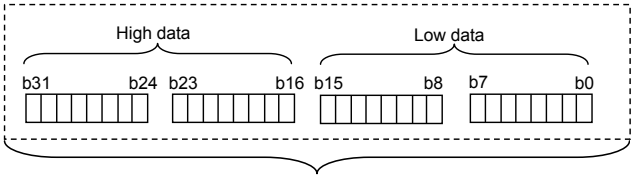
<Channel No., Group No.>
ME96 returns fixed data determined for each measuring items. (About fixed data, refer to Table 7.2 to Table 7.12)
(Example:When selected phase 1 current (Inst), channel No.is 21h, group No. is 01h.)

<Multiplying factor>
Multiplying factor is fixed for each items according to phase wire system, primary voltage and primary current.(For details, refer to Table 7.22)

■Correspondence of index number and multiplying factor.

Index number	Multiplying factor	Remarks
02H	$\times 10^{2}$	Actual value = Numerical value × Multiplying factor
01H	×10	
00H	×1	
FFH	$\times 10^{-1}$	
FEH	$\times 10^{-2}$	
FDH	$\times 10^{-3}$	
FCH	$\times 10^{-4}$	

<Numerical value>



Numerical value: 32-bit integer with a sign
-2147483648～2147483647
(80000000H～7FFFFFFFH)

■Example: Active power

Index number	Data (Numerical value)	Actual value
FFH	000000FFH ⇒ 255	255×10^{-1}＝25.5[kW]
00H	FFFFFF01H ⇒ -255	-255×1＝-255[kW]

■Example: power factor

Index number	Data (Numerical value)	Actual value
FFH	000003E3H ⇒ 995	995×10^{-1}＝99.5[%]
FFH	FFFFFC1DH⇒ -995	-995×10^{-1}＝-99.5[%]

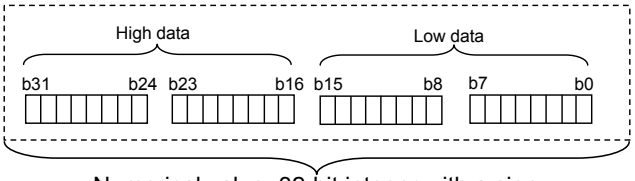
(2) Group format ②

For group format ②, Up to 16 measuring items can be monitored per a group. Measuring items are expressed in 2 words. However, it is necessary to be multiplied by using Table 7.22 because there is no multiplying factor data .

Group format ②

	b15 b8	b7 b0
RWr00	Low data	
RWr01	High data	
RWr02	Low data	
RWr03	High data	
RWr04	Low data	
RWr05	High data	
RWr06	Low data	
RWr07	High data	
RWr08	Low data	
RWr09	High data	
RWr0A	Low data	
RWr0B	High data	
RWr0C	Low data	
RWr0D	High data	
RWr0E	Low data	
RWr0F	High data	
RWr10	Low data	
RWr11	High data	
RWr12	Low data	
RWr13	High data	
RWr14	Low data	
RWr15	High data	
RWr16	Low data	
RWr17	High data	
RWr18	Low data	
RWr19	High data	
RWr1A	Low data	
RWr1B	High data	
RWr1C	Low data	
RWr1D	High data	
RWr1E	Low data	
RWr1F	High data	

<Numerical value>



Numerical value: 32-bit integer with a sign
-2147483648～2147483647
(80000000H～7FFFFFFFH)

Format of numerical value is same to group format ①.
This format is not contain multiplying factor data. Therefore, Confirm the multiplying factor fixed according to phase wire system, primary voltage and primary current by Table 7.22, and multiply it using sequence program.

■Example: Phase 1 current
When setting of primary current is 200A, multiplying factor is $\times 10^{-1}$ according to section Table 7.22.

Data(Numerical value)	Actual value
000000FFH ⇒ 255	$255 \times 10^{-1} = 25.5$[A]

■Example: Active power
When settings are follows, multiplying factor is ×10 according to section Table 7.22.
・Phase wire system: 3P4W
・Primary voltage: 254/440V
・Primary current: 2000A
→Total load = 3 × 254 × 2000 / 1000 = 1524[kW]

Data(Numerical value)	Actual value
0000FFFFH ⇒ 65535	65535×10＝655350[kWh]

7.2.2 When Monitoring by Command(1H)

Up to 8 measuring values can be monitored by setting the unit No., group No. and channel No. to remote registers(RWw). Monitor pattern setting flag(RX(n+1)0) is used to send the command. (For details, refer to section 6.4.2)

The command can be sent only when the remote READY(RX(n+7)B) is ON.

1H	Data Monitor

Remote register RWw(Programmable controller→ME96)

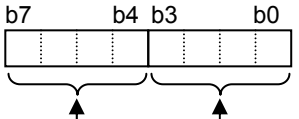
	b15 – b8	b7 – b0	
RWw00	Group No.	Unit No. / 1H	Item 1
RWw01	00H	Channel No.	
RWw02	00H	00H	
RWw03	00H	00H	
RWw04	Group No.	Unit No. / 1H	Item 2
RWw05	00H	Channel No.	
RWw06	00H	00H	
RWw07	00H	00H	
to	to		
RWw1C	Group No.	Unit No. / 1H	Item 8
RWw1D	00H	Channel No.	
RWw1E	00H	00H	
RWw1F	00H	00H	

Remote register RWw(ME96→Programmable controller)

	b15 – b8	b7 – b0	
RWr00	Channel No.	Group No.	Item 1
RWr01	Index number	(Error code)	
RWr02	Low data		
RWr03	High data		
RWr04	Channel No.	Group No.	Item 2
RWr05	Index number	(Error code)	
RWr06	Low data		
RWr07	High data		
to	to		
RWr1C	Channel No.	Group No.	Item 8
RWr1D	Index number	(Error code)	
RWr1E	Low data		
RWr1F	High data		

* At normal communication, Error code is 00h.
About the other error code, refer to Table 7.23.

* It is described as 8 bits data by combining the unit No. (high 4 bits) and the command (low 4 bits)



Command: Data range is 0H to 7H
Unit No.: Data range is 0H to 7H
(0H or 1H is used for the unit No. of ME96.)

For example, When the unit No. is 0H and the command is 1H, it becomes “01H”.

- ME96 can monitor the value of measurement items which are not displayed.
- The measurement items are assigned Unit No., Group No. and Channel No. (Refer to Table 7.2 to Table 7.12)
- Store the unused space to 00H when monitoring items are under 8.
- The details of data format are shown in the Table 7.14 to Table 7.21
- The monitering items are changed with the setting of phase wire system.(Refer to Table 7.2 to Table 7.12)
- When conbined command(2H), an error occers.
- In case of monitoring the present value and its maximum continuously according to the renewal data timing of ME96, the maximum may be smaller than the present value.

Table 7.2 Group Channel List (1/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel			ME96SSH-MB			ME96SSR-MB			Data type	Note
						3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	F0	02	Model code			○	○	○	○	○	○	⑥	
0	E0	11	Primary current			○	○	○	○	○	○	⑤	
0	E0	12	Primary voltage(L-L)			○	○	○	○	○	○	⑤	
0	E0	1B	Primary voltage（L-N）			○	－	－	○	－	－	⑤	
0	E0	1C	Secondary voltage（L-N）			○	○	○	○	○	○	⑤	*2,*3
0	E0	13	Phase & Wiring			○	○	○	○	○	○	⑥	
0	E0	1D	Frequency			○	○	○	○	○	○	⑤	
0	E0	1E	Secondary current			○	○	○	○	○	○	⑤	
0	E0	18	Alarm items			○	○	○	○	○	○	⑦	
0	E0	19	Byte monitor			○	○	○	○	○	○	⑥	
0	E0	1A	Attribute monitor			○	○	○	○	○	○	⑥	
0	02	E0	Time constant for current demand	sec.		○	○	○	○	○	○	⑥	
0	08	E4	Interval time constant	min.		○	○	○	－	－	－	⑥	
0	08	E5	Subinterval time constant	min.		○	○	○	－	－	－	⑥	
0	01	01	Average current	A	Inst.	○	○	－	○	○	－	①	
0	01	21	Phase 1 current	A	Inst.	○	○	○	○	○	○	①	
0	01	41	Phase 2 current	A	Inst.	○	○	－	○	○	－	①	
0	01	61	Phase 3 current	A	Inst.	○	○	－	○	○	－	①	
0	01	81	Phase N current	A	Inst.	○	－	－	○	－	－	①	
0	01	02	Average current	A	max.	○	○	－	○	○	－	①	
0	01	22	Phase 1 current	A	max.	○	○	○	○	○	○	①	
0	01	42	Phase 2 current	A	max.	○	○	－	○	○	－	①	
0	01	62	Phase 3 current	A	max.	○	○	－	○	○	－	①	
0	01	82	Phase N current	A	max.	○	－	－	○	－	－	①	
0	01	05	Average current	A	min.	○	○	－	○	○	－	①	
0	01	25	Phase 1 current	A	min.	○	○	○	○	○	○	①	
0	01	45	Phase 2 current	A	min.	○	○	－	○	○	－	①	
0	01	65	Phase 3 current	A	min.	○	○	－	○	○	－	①	
0	01	85	Phase N current	A	min.	○	－	－	○	－	－	①	
0	02	01	Average current demand	A	Inst.	○	○	－	○	○	－	①	
0	02	21	Phase 1 current demand	A	Inst.	○	○	○	○	○	○	①	
0	02	41	Phase 2 current demand	A	Inst.	○	○	－	○	○	－	①	
0	02	61	Phase 3 current demand	A	Inst.	○	○	－	○	○	－	①	
0	02	81	Phase N current demand	A	Inst.	○	－	－	○	－	－	①	
0	02	02	Average current demand	A	max.	○	○	－	○	○	－	①	
0	02	22	Phase 1 current demand	A	max.	○	○	○	○	○	○	①	
0	02	42	Phase 2 current demand	A	max.	○	○	－	○	○	－	①	
0	02	62	Phase 3 current demand	A	max.	○	○	－	○	○	－	①	
0	02	82	Phase N current demand	A	max.	○	－	－	○	－	－	①	
0	02	05	Average current demand	A	min.	○	○	－	○	○	－	①	
0	02	25	Phase 1 current demand	A	min.	○	○	○	○	○	○	①	
0	02	45	Phase 2 current demand	A	min.	○	○	－	○	○	－	①	
0	02	65	Phase 3 current demand	A	min.	○	○	－	○	○	－	①	
0	02	85	Phase N current demand	A	min.	○	－	－	○	－	－	①	
0	05	01	Average L-L voltage	V	Inst.	○	○	－	○	○	－	①	
0	05	21	1-2 voltage	V	Inst.	○	○	○	○	○	○	①	
0	05	41	2-3 voltage	V	Inst.	○	○	－	○	○	－	①	
0	05	61	3-1 voltage	V	Inst.	○	○	－	○	○	－	①	
0	05	02	Average L-L voltage	V	max.	○	○	－	○	○	－	①	
0	05	22	1-2 voltage	V	max.	○	○	○	○	○	○	①	
0	05	42	2-3 voltage	V	max.	○	○	－	○	○	－	①	
0	05	62	3-1 voltage	V	max.	○	○	－	○	○	－	①	
0	05	05	Average L-L voltage	V	min.	○	○	－	○	○	－	①	
0	05	25	1-2 voltage	V	min.	○	○	○	○	○	○	①	
0	05	45	2-3 voltage	V	min.	○	○	－	○	○	－	①	
0	05	65	3-1 voltage	V	min.	○	○	－	○	○	－	①	

Note: Measurement data correspond as follows according to setting of phase wiring. (Maximum / Minimum data and harmonic data are same.)

Name of channel	Phase wiring			
	3P3W	1P3W(1N3)	1P3W(1N2)	1P2W
1-2 voltage	1-2 voltage	1-N voltage	1-N voltage	Voltage
2-3 voltage	2-3 voltage	3-N voltage	2-N voltage	-
3-1 voltage	3-1 voltage	1-3 voltage	1-3 voltage	-
Phase 1 current	Phase 1 current	Phase 1 current	Phase 1 current	Current
Phase 2 current	Phase 2 current	Phase N current	Phase N current	-
Phase 3 current	Phase 3 current	Phase 3 current	Phase 2 current	-

Table 7.3 Group Channel List (2/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel			ME96SSH-MB			ME96SSR-MB			Data type	Note
						3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	03	01	Average L-N voltage	V	Inst.	○	－	－	○	－	－	①	
0	03	21	1-N voltage	V	Inst.	○	－	－	○	－	－	①	
0	03	41	2-N voltage	V	Inst.	○	－	－	○	－	－	①	
0	03	61	3-N voltage	V	Inst.	○	－	－	○	－	－	①	
0	03	02	Average L-N voltage	V	max.	○	－	－	○	－	－	①	
0	03	22	1-N voltage	V	max.	○	－	－	○	－	－	①	
0	03	42	2-N voltage	V	max.	○	－	－	○	－	－	①	
0	03	62	3-N voltage	V	max.	○	－	－	○	－	－	①	
0	03	05	Average L-N voltage	V	min.	○	－	－	○	－	－	①	
0	03	25	1-N voltage	V	min.	○	－	－	○	－	－	①	
0	03	45	2-N voltage	V	min.	○	－	－	○	－	－	①	
0	03	65	3-N voltage	V	min.	○	－	－	○	－	－	①	
0	07	01	Total active power	kW	Inst.	○	○	○	○	○	○	①	
0	07	21	Phase 1 active power	kW	Inst.	○	－	－	○	－	－	①	
0	07	41	Phase 2 active power	kW	Inst.	○	－	－	○	－	－	①	
0	07	61	Phase 3 active power	kW	Inst.	○	－	－	○	－	－	①	
0	07	02	Total active power	kW	max.	○	－	－	○	－	－	①	
0	07	22	Phase 1 active power	kW	max.	○	○	○	○	○	○	①	
0	07	42	Phase 2 active power	kW	max.	○	－	－	○	－	－	①	
0	07	62	Phase 3 active power	kW	max.	○	－	－	○	－	－	①	
0	07	05	Total active power	kW	min.	○	○	○	○	○	○	①	
0	07	25	Phase 1 active power	kW	min.	○	－	－	○	－	－	①	
0	07	45	Phase 2 active power	kW	min.	○	－	－	○	－	－	①	
0	07	65	Phase 3 active power	kW	min.	○	－	－	○	－	－	①	
0	08	01	Total rolling demand	kW	Inst.	○	○	○	－	－	－	①	
0	08	02	Total rolling demand	kW	max.	○	○	○	－	－	－	①	
0	09	01	Total reactive power	kvar	Inst.	○	○	○	○	○	○	①	
0	09	21	Phase 1 reactive power	kvar	Inst.	○	－	－	○	－	－	①	
0	09	41	Phase 2 reactive power	kvar	Inst.	○	－	－	○	－	－	①	
0	09	61	Phase 3 reactive power	kvar	Inst.	○	－	－	○	－	－	①	
0	09	02	Total reactive power	kvar	max.	○	○	○	○	○	○	①	
0	09	22	Phase 1 reactive power	kvar	max.	○	－	－	○	－	－	①	
0	09	42	Phase 2 reactive power	kvar	max.	○	－	－	○	－	－	①	
0	09	62	Phase 3 reactive power	kvar	max.	○	－	－	○	－	－	①	
0	09	05	Total reactive power	kvar	min.	○	○	○	○	○	○	①	
0	09	25	Phase 1 reactive power	kvar	min.	○	－	－	○	－	－	①	
0	09	45	Phase 2 reactive power	kvar	min.	○	－	－	○	－	－	①	
0	09	65	Phase 3 reactive power	kvar	min.	○	－	－	○	－	－	①	
1	0B	01	Total apparent power	kVA	Inst.	○	－	－	○	－	－	①	
1	0B	21	Phase 1 apparent power	kVA	Inst.	○	－	－	○	－	－	①	
1	0B	41	Phase 2 apparent power	kVA	Inst.	○	－	－	○	－	－	①	
1	0B	61	Phase 3 apparent power	kVA	Inst.	○	－	－	○	－	－	①	
1	0B	02	Total apparent power	kVA	max.	○	－	－	○	－	－	①	
1	0B	22	Phase 1 apparent power	kVA	max.	○	－	－	○	－	－	①	
1	0B	42	Phase 2 apparent power	kVA	max.	○	－	－	○	－	－	①	
1	0B	62	Phase 3 apparent power	kVA	max.	○	－	－	○	－	－	①	
1	0B	05	Total apparent power	kVA	min.	○	－	－	○	－	－	①	
1	0B	25	Phase 1 apparent power	kVA	min.	○	－	－	○	－	－	①	
1	0B	45	Phase 2 apparent power	kVA	min.	○	－	－	○	－	－	①	
1	0B	65	Phase 3 apparent power	kVA	min.	○	－	－	○	－	－	①	

Table 7.4 Group Channel List (3/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	0D	01	Total power factor	%	Inst.		○	○	○	○	○	○	①	
0	0D	21	Phase 1 power factor	%	Inst.		○	–	–	○	–	–	①	
0	0D	41	Phase 2 power factor	%	Inst.		○	–	–	○	–	–	①	
0	0D	61	Phase 3 power factor	%	Inst.		○	–	–	○	–	–	①	
0	0D	02	Total power factor	%	max.		○	○	○	○	○	○	①	
0	0D	22	Phase 1 power factor	%	max.		○	–	–	○	–	–	①	
0	0D	42	Phase 2 power factor	%	max.		○	–	–	○	–	–	①	
0	0D	62	Phase 3 power factor	%	max.		○	–	–	○	–	–	①	
0	0D	05	Total power factor	%	min.		○	○	○	○	○	○	①	
0	0D	25	Phase 1 power factor	%	min.		○	–	–	○	–	–	①	
0	0D	45	Phase 2 power factor	%	min.		○	–	–	○	–	–	①	
0	0D	65	Phase 3 power factor	%	min.		○	–	–	○	–	–	①	
0	0F	01	Frequency	Hz	Inst.		○	○	○	○	○	○	①	
0	0F	02	Frequency	Hz	max.		○	○	○	○	○	○	①	
0	0F	05	Frequency	Hz	min.		○	○	○	○	○	○	①	
0	63	21	1-2 harmonic voltage	V	Inst.	Total	–	○	○	–	○	○	①	
0	4D	21	1-2 harmonic voltage	V	Inst.	1st	–	○	○	–	○	○	①	
0	4F	21	1-2 harmonic voltage	V	Inst.	3rd	–	○	○	–	○	○	①	
0	51	21	1-2 harmonic voltage	V	Inst.	5th	–	○	○	–	○	○	①	
0	53	21	1-2 harmonic voltage	V	Inst.	7th	–	○	○	–	○	○	①	
0	55	21	1-2 harmonic voltage	V	Inst.	9th	–	○	○	–	○	○	①	
0	57	21	1-2 harmonic voltage	V	Inst.	11th	–	○	○	–	○	○	①	
0	59	21	1-2 harmonic voltage	V	Inst.	13th	–	○	○	–	○	○	①	
1	5B	21	1-2 harmonic voltage	V	Inst.	15th	–	○	○	–	–	–	①	
1	5D	21	1-2 harmonic voltage	V	Inst.	17th	–	○	○	–	–	–	①	
1	5F	21	1-2 harmonic voltage	V	Inst.	19th	–	○	○	–	–	–	①	
1	61	21	1-2 harmonic voltage	V	Inst.	21st	–	○	○	–	–	–	①	
1	79	02	1-2 harmonic voltage	V	Inst.	23rd	–	○	○	–	–	–	①	
1	79	04	1-2 harmonic voltage	V	Inst.	25th	–	○	○	–	–	–	①	
1	79	06	1-2 harmonic voltage	V	Inst.	27th	–	○	○	–	–	–	①	
1	79	08	1-2 harmonic voltage	V	Inst.	29th	–	○	○	–	–	–	①	
1	79	0A	1-2 harmonic voltage	V	Inst.	31st	–	○	○	–	–	–	①	
0	76	86	1-2 voltage THD	%	Inst.	Total	–	○	○	–	○	○	①	
0	76	73	1-2 voltage harmonic distortion	%	Inst.	3rd	–	○	○	–	○	○	①	
0	76	75	1-2 voltage harmonic distortion	%	Inst.	5th	–	○	○	–	○	○	①	
0	76	77	1-2 voltage harmonic distortion	%	Inst.	7th	–	○	○	–	○	○	①	
0	76	79	1-2 voltage harmonic distortion	%	Inst.	9th	–	○	○	–	○	○	①	
0	76	7B	1-2 voltage harmonic distortion	%	Inst.	11th	–	○	○	–	○	○	①	
0	76	7D	1-2 voltage harmonic distortion	%	Inst.	13th	–	○	○	–	○	○	①	
1	76	7F	1-2 voltage harmonic distortion	%	Inst.	15th	–	○	○	–	–	–	①	
1	76	81	1-2 voltage harmonic distortion	%	Inst.	17th	–	○	○	–	–	–	①	
1	76	83	1-2 voltage harmonic distortion	%	Inst.	19th	–	○	○	–	–	–	①	
1	76	85	1-2 voltage harmonic distortion	%	Inst.	21st	–	○	○	–	–	–	①	
1	79	72	1-2 voltage harmonic distortion	%	Inst.	23rd	–	○	○	–	–	–	①	
1	79	74	1-2 voltage harmonic distortion	%	Inst.	25th	–	○	○	–	–	–	①	
1	79	76	1-2 voltage harmonic distortion	%	Inst.	27th	–	○	○	–	–	–	①	
1	79	78	1-2 voltage harmonic distortion	%	Inst.	29th	–	○	○	–	–	–	①	
1	79	7A	1-2 voltage harmonic distortion	%	Inst.	31st	–	○	○	–	–	–	①	

Table 7.5 Group Channel List (4/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	63	41	2-3 harmonic voltage	V	Inst.	Total	−	○	−	−	○	−	①	
0	4D	41	2-3 harmonic voltage	V	Inst.	1st	−	○	−	−	○	−	①	
0	4F	41	2-3 harmonic voltage	V	Inst.	3rd	−	○	−	−	○	−	①	
0	51	41	2-3 harmonic voltage	V	Inst.	5th	−	○	−	−	○	−	①	
0	53	41	2-3 harmonic voltage	V	Inst.	7th	−	○	−	−	○	−	①	
0	55	41	2-3 harmonic voltage	V	Inst.	9th	−	○	−	−	○	−	①	
0	57	41	2-3 harmonic voltage	V	Inst.	11th	−	○	−	−	○	−	①	
0	59	41	2-3 harmonic voltage	V	Inst.	13th	−	○	−	−	○	−	①	
1	5B	41	2-3 harmonic voltage	V	Inst.	15th	−	○	−	−	−	−	①	
1	5D	41	2-3 harmonic voltage	V	Inst.	17th	−	○	−	−	−	−	①	
1	5F	41	2-3 harmonic voltage	V	Inst.	19th	−	○	−	−	−	−	①	
1	61	41	2-3 harmonic voltage	V	Inst.	21st	−	○	−	−	−	−	①	
1	79	18	2-3 harmonic voltage	V	Inst.	23rd	−	○	−	−	−	−	①	
1	79	1A	2-3 harmonic voltage	V	Inst.	25th	−	○	−	−	−	−	①	
1	79	1C	2-3 harmonic voltage	V	Inst.	27th	−	○	−	−	−	−	①	
1	79	1E	2-3 harmonic voltage	V	Inst.	29th	−	○	−	−	−	−	①	
1	79	20	2-3 harmonic voltage	V	Inst.	31st	−	○	−	−	−	−	①	
0	76	9C	2-3 voltage THD	%	Inst.	Total	−	○	−	−	○	−	①	
0	76	89	2-3 voltage harmonic distortion	%	Inst.	3rd	−	○	−	−	○	−	①	
0	76	8B	2-3 voltage harmonic distortion	%	Inst.	5th	−	○	−	−	○	−	①	
0	76	8D	2-3 voltage harmonic distortion	%	Inst.	7th	−	○	−	−	○	−	①	
0	76	8F	2-3 voltage harmonic distortion	%	Inst.	9th	−	○	−	−	○	−	①	
0	76	91	2-3 voltage harmonic distortion	%	Inst.	11th	−	○	−	−	○	−	①	
0	76	93	2-3 voltage harmonic distortion	%	Inst.	13th	−	○	−	−	○	−	①	
1	76	95	2-3 voltage harmonic distortion	%	Inst.	15th	−	○	−	−	−	−	①	
1	76	97	2-3 voltage harmonic distortion	%	Inst.	17th	−	○	−	−	−	−	①	
1	76	99	2-3 voltage harmonic distortion	%	Inst.	19th	−	○	−	−	−	−	①	
1	76	9B	2-3 voltage harmonic distortion	%	Inst.	21st	−	○	−	−	−	−	①	
1	79	88	2-3 voltage harmonic distortion	%	Inst.	23rd	−	○	−	−	−	−	①	
1	79	8A	2-3 voltage harmonic distortion	%	Inst.	25th	−	○	−	−	−	−	①	
1	79	8C	2-3 voltage harmonic distortion	%	Inst.	27th	−	○	−	−	−	−	①	
1	79	8E	2-3 voltage harmonic distortion	%	Inst.	29th	−	○	−	−	−	−	①	
1	79	90	2-3 voltage harmonic distortion	%	Inst.	31st	−	○	−	−	−	−	①	
0	76	DE	L-L voltage THD	%	max.	Total	−	○	○	−	○	○	①	
0	4D	A2	L-L harmonic voltage	V	max.	1st	−	○	○	−	○	○	①	
0	76	CB	L-L voltage harmonic distortion	%	max.	3rd	−	○	○	−	○	○	①	
0	76	CD	L-L voltage harmonic distortion	%	max.	5th	−	○	○	−	○	○	①	
0	76	CF	L-L voltage harmonic distortion	%	max.	7th	−	○	○	−	○	○	①	
0	76	D1	L-L voltage harmonic distortion	%	max.	9th	−	○	○	−	○	○	①	
0	76	D3	L-L voltage harmonic distortion	%	max.	11th	−	○	○	−	○	○	①	
0	76	D5	L-L voltage harmonic distortion	%	max.	13th	−	○	○	−	○	○	①	
1	76	D7	L-L voltage harmonic distortion	%	max.	15th	−	○	○	−	−	−	①	
1	76	D9	L-L voltage harmonic distortion	%	max.	17th	−	○	○	−	−	−	①	
1	76	DB	L-L voltage harmonic distortion	%	max.	19th	−	○	○	−	−	−	①	
1	76	DD	L-L voltage harmonic distortion	%	max.	21st	−	○	○	−	−	−	①	
1	79	CA	L-L voltage harmonic distortion	%	max.	23rd	−	○	○	−	−	−	①	
1	79	CC	L-L voltage harmonic distortion	%	max.	25th	−	○	○	−	−	−	①	
1	79	CE	L-L voltage harmonic distortion	%	max.	27th	−	○	○	−	−	−	①	
1	79	D0	L-L voltage harmonic distortion	%	max.	29th	−	○	○	−	−	−	①	
1	79	D2	L-L voltage harmonic distortion	%	max.	31st	−	○	○	−	−	−	①	

Table 7.6 Group Channel List (5/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	4B	21	1-N harmonic voltage	V	Inst.	Total	○	–	–	○	–	–	①	
0	35	21	1-N harmonic voltage	V	Inst.	1st	○	–	–	○	–	–	①	
1	37	21	1-N harmonic voltage	V	Inst.	3rd	○	–	–	○	–	–	①	
1	39	21	1-N harmonic voltage	V	Inst.	5th	○	–	–	○	–	–	①	
1	3B	21	1-N harmonic voltage	V	Inst.	7th	○	–	–	○	–	–	①	
1	3D	21	1-N harmonic voltage	V	Inst.	9th	○	–	–	○	–	–	①	
1	3F	21	1-N harmonic voltage	V	Inst.	11th	○	–	–	○	–	–	①	
1	41	21	1-N harmonic voltage	V	Inst.	13th	○	–	–	○	–	–	①	
1	43	21	1-N harmonic voltage	V	Inst.	15th	○	–	–	–	–	–	①	
1	45	21	1-N harmonic voltage	V	Inst.	17th	○	–	–	–	–	–	①	
1	47	21	1-N harmonic voltage	V	Inst.	19th	○	–	–	–	–	–	①	
1	49	21	1-N harmonic voltage	V	Inst.	21st	○	–	–	–	–	–	①	
1	7A	02	1-N harmonic voltage	V	Inst.	23rd	○	–	–	–	–	–	①	
1	7A	04	1-N harmonic voltage	V	Inst.	25th	○	–	–	–	–	–	①	
1	7A	06	1-N harmonic voltage	V	Inst.	27th	○	–	–	–	–	–	①	
1	7A	08	1-N harmonic voltage	V	Inst.	29th	○	–	–	–	–	–	①	
1	7A	0A	1-N harmonic voltage	V	Inst.	31st	○	–	–	–	–	–	①	
0	77	86	1-N voltage THD	%	Inst.	Total	○	–	–	○	–	–	①	
0	77	73	1-N voltage harmonic distortion	%	Inst.	3rd	○	–	–	○	–	–	①	
0	77	75	1-N voltage harmonic distortion	%	Inst.	5th	○	–	–	○	–	–	①	
0	77	77	1-N voltage harmonic distortion	%	Inst.	7th	○	–	–	○	–	–	①	
0	77	79	1-N voltage harmonic distortion	%	Inst.	9th	○	–	–	○	–	–	①	
0	77	7B	1-N voltage harmonic distortion	%	Inst.	11th	○	–	–	○	–	–	①	
0	77	7D	1-N voltage harmonic distortion	%	Inst.	13th	○	–	–	○	–	–	①	
1	77	7F	1-N voltage harmonic distortion	%	Inst.	15th	○	–	–	–	–	–	①	
1	77	81	1-N voltage harmonic distortion	%	Inst.	17th	○	–	–	–	–	–	①	
1	77	83	1-N voltage harmonic distortion	%	Inst.	19th	○	–	–	–	–	–	①	
1	77	85	1-N voltage harmonic distortion	%	Inst.	21st	○	–	–	–	–	–	①	
1	7A	72	1-N voltage harmonic distortion	%	Inst.	23rd	○	–	–	–	–	–	①	
1	7A	74	1-N voltage harmonic distortion	%	Inst.	25th	○	–	–	–	–	–	①	
1	7A	76	1-N voltage harmonic distortion	%	Inst.	27th	○	–	–	–	–	–	①	
1	7A	78	1-N voltage harmonic distortion	%	Inst.	29th	○	–	–	–	–	–	①	
1	7A	7A	1-N voltage harmonic distortion	%	Inst.	31st	○	–	–	–	–	–	①	
0	4B	41	2-N harmonic voltage	V	Inst.	Total	○	–	–	○	–	–	①	
0	35	41	2-N harmonic voltage	V	Inst.	1st	○	–	–	○	–	–	①	
1	37	41	2-N harmonic voltage	V	Inst.	3rd	○	–	–	○	–	–	①	
1	39	41	2-N harmonic voltage	V	Inst.	5th	○	–	–	○	–	–	①	
1	3B	41	2-N harmonic voltage	V	Inst.	7th	○	–	–	○	–	–	①	
1	3D	41	2-N harmonic voltage	V	Inst.	9th	○	–	–	○	–	–	①	
1	3F	41	2-N harmonic voltage	V	Inst.	11th	○	–	–	○	–	–	①	
1	41	41	2-N harmonic voltage	V	Inst.	13th	○	–	–	○	–	–	①	
1	43	41	2-N harmonic voltage	V	Inst.	15th	○	–	–	–	–	–	①	
1	45	41	2-N harmonic voltage	V	Inst.	17th	○	–	–	–	–	–	①	
1	47	41	2-N harmonic voltage	V	Inst.	19th	○	–	–	–	–	–	①	
1	49	41	2-N harmonic voltage	V	Inst.	21st	○	–	–	–	–	–	①	
1	7A	18	2-N harmonic voltage	V	Inst.	23rd	○	–	–	–	–	–	①	
1	7A	1A	2-N harmonic voltage	V	Inst.	25th	○	–	–	–	–	–	①	
1	7A	1C	2-N harmonic voltage	V	Inst.	27th	○	–	–	–	–	–	①	
1	7A	1E	2-N harmonic voltage	V	Inst.	29th	○	–	–	–	–	–	①	
1	7A	20	2-N harmonic voltage	V	Inst.	31st	○	–	–	–	–	–	①	

Table 7.7 Group Channel List (6/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	77	9C	2-N voltage THD	%	Inst.	Total	○	–	–	○	–	–	①	
0	77	89	2-N voltage harmonic distortion	%	Inst.	3rd	○	–	–	○	–	–	①	
0	77	8B	2-N voltage harmonic distortion	%	Inst.	5th	○	–	–	○	–	–	①	
0	77	8D	2-N voltage harmonic distortion	%	Inst.	7th	○	–	–	○	–	–	①	
0	77	8F	2-N voltage harmonic distortion	%	Inst.	9th	○	–	–	○	–	–	①	
0	77	91	2-N voltage harmonic distortion	%	Inst.	11th	○	–	–	○	–	–	①	
0	77	93	2-N voltage harmonic distortion	%	Inst.	13th	○	–	–	○	–	–	①	
1	77	95	2-N voltage harmonic distortion	%	Inst.	15th	○	–	–	–	–	–	①	
1	77	97	2-N voltage harmonic distortion	%	Inst.	17th	○	–	–	–	–	–	①	
1	77	99	2-N voltage harmonic distortion	%	Inst.	19th	○	–	–	–	–	–	①	
1	77	9B	2-N voltage harmonic distortion	%	Inst.	21st	○	–	–	–	–	–	①	
1	7A	88	2-N voltage harmonic distortion	%	Inst.	23rd	○	–	–	–	–	–	①	
1	7A	8A	2-N voltage harmonic distortion	%	Inst.	25th	○	–	–	–	–	–	①	
1	7A	8C	2-N voltage harmonic distortion	%	Inst.	27th	○	–	–	–	–	–	①	
1	7A	8E	2-N voltage harmonic distortion	%	Inst.	29th	○	–	–	–	–	–	①	
1	7A	90	2-N voltage harmonic distortion	%	Inst.	31st	○	–	–	–	–	–	①	
0	4B	61	3-N harmonic voltage	V	Inst.	Total	○	–	–	○	–	–	①	
0	35	61	3-N harmonic voltage	V	Inst.	1st	○	–	–	○	–	–	①	
1	37	61	3-N harmonic voltage	V	Inst.	3rd	○	–	–	○	–	–	①	
1	39	61	3-N harmonic voltage	V	Inst.	5th	○	–	–	○	–	–	①	
1	3B	61	3-N harmonic voltage	V	Inst.	7th	○	–	–	○	–	–	①	
1	3D	61	3-N harmonic voltage	V	Inst.	9th	○	–	–	○	–	–	①	
1	3F	61	3-N harmonic voltage	V	Inst.	11th	○	–	–	○	–	–	①	
1	41	61	3-N harmonic voltage	V	Inst.	13th	○	–	–	○	–	–	①	
1	43	61	3-N harmonic voltage	V	Inst.	15th	○	–	–	–	–	–	①	
1	45	61	3-N harmonic voltage	V	Inst.	17th	○	–	–	–	–	–	①	
1	47	61	3-N harmonic voltage	V	Inst.	19th	○	–	–	–	–	–	①	
1	49	61	3-N harmonic voltage	V	Inst.	21st	○	–	–	–	–	–	①	
1	7A	2E	3-N harmonic voltage	V	Inst.	23rd	○	–	–	–	–	–	①	
1	7A	30	3-N harmonic voltage	V	Inst.	25th	○	–	–	–	–	–	①	
1	7A	32	3-N harmonic voltage	V	Inst.	27th	○	–	–	–	–	–	①	
1	7A	34	3-N harmonic voltage	V	Inst.	29th	○	–	–	–	–	–	①	
1	7A	36	3-N harmonic voltage	V	Inst.	31st	○	–	–	–	–	–	①	
0	77	B2	3-N voltage THD	%	Inst.	Total	○	–	–	○	–	–	①	
0	77	9F	3-N voltage harmonic distortion	%	Inst.	3rd	○	–	–	○	–	–	①	
0	77	A1	3-N voltage harmonic distortion	%	Inst.	5th	○	–	–	○	–	–	①	
0	77	A3	3-N voltage harmonic distortion	%	Inst.	7th	○	–	–	○	–	–	①	
0	77	A5	3-N voltage harmonic distortion	%	Inst.	9th	○	–	–	○	–	–	①	
0	77	A7	3-N voltage harmonic distortion	%	Inst.	11th	○	–	–	○	–	–	①	
0	77	A9	3-N voltage harmonic distortion	%	Inst.	13th	○	–	–	○	–	–	①	
1	77	AB	3-N voltage harmonic distortion	%	Inst.	15th	○	–	–	–	–	–	①	
1	77	AD	3-N voltage harmonic distortion	%	Inst.	17th	○	–	–	–	–	–	①	
1	77	AF	3-N voltage harmonic distortion	%	Inst.	19th	○	–	–	–	–	–	①	
1	77	B1	3-N voltage harmonic distortion	%	Inst.	21st	○	–	–	–	–	–	①	
1	7A	9E	3-N voltage harmonic distortion	%	Inst.	23rd	○	–	–	–	–	–	①	
1	7A	A0	3-N voltage harmonic distortion	%	Inst.	25th	○	–	–	–	–	–	①	
1	7A	A2	3-N voltage harmonic distortion	%	Inst.	27th	○	–	–	–	–	–	①	
1	7A	A4	3-N voltage harmonic distortion	%	Inst.	29th	○	–	–	–	–	–	①	
1	7A	A6	3-N voltage harmonic distortion	%	Inst.	31st	○	–	–	–	–	–	①	

Table 7.8 Group Channel List (7/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	77	DE	L-N voltage THD	%	max.	Total	○	–	–	○	–	–	①	
0	35	A2	L-N harmonic voltage	V	max.	1st	○	–	–	○	–	–	①	
0	77	CB	L-N voltage harmonic distortion	%	max.	3rd	○	–	–	○	–	–	①	
0	77	CD	L-N voltage harmonic distortion	%	max.	5th	○	–	–	○	–	–	①	
0	77	CF	L-N voltage harmonic distortion	%	max.	7th	○	–	–	○	–	–	①	
0	77	D1	L-N voltage harmonic distortion	%	max.	9th	○	–	–	○	–	–	①	
0	77	D3	L-N voltage harmonic distortion	%	max.	11th	○	–	–	○	–	–	①	
0	77	D5	L-N voltage harmonic distortion	%	max.	13th	○	–	–	○	–	–	①	
1	77	D7	L-N voltage harmonic distortion	%	max.	15th	○	–	–	–	–	–	①	
1	77	D9	L-N voltage harmonic distortion	%	max.	17th	○	–	–	–	–	–	①	
1	77	DB	L-N voltage harmonic distortion	%	max.	19th	○	–	–	–	–	–	①	
1	77	DD	L-N voltage harmonic distortion	%	max.	21st	○	–	–	–	–	–	①	
1	7A	CA	L-N voltage harmonic distortion	%	max.	23rd	○	–	–	–	–	–	①	
1	7A	CC	L-N voltage harmonic distortion	%	max.	25th	○	–	–	–	–	–	①	
1	7A	CE	L-N voltage harmonic distortion	%	max.	27th	○	–	–	–	–	–	①	
1	7A	D0	L-N voltage harmonic distortion	%	max.	29th	○	–	–	–	–	–	①	
1	7A	D2	L-N voltage harmonic distortion	%	max.	31st	○	–	–	–	–	–	①	
0	33	21	Phase 1 harmonic current	A	Inst.	Total	○	○	○	○	○	○	①	
0	1D	21	Phase 1 harmonic current	A	Inst.	1st	○	○	○	○	○	○	①	
0	1F	21	Phase 1 harmonic current	A	Inst.	3rd	○	○	○	○	○	○	①	
0	21	21	Phase 1 harmonic current	A	Inst.	5th	○	○	○	○	○	○	①	
0	23	21	Phase 1 harmonic current	A	Inst.	7th	○	○	○	○	○	○	①	
0	25	21	Phase 1 harmonic current	A	Inst.	9th	○	○	○	○	○	○	①	
0	27	21	Phase 1 harmonic current	A	Inst.	11th	○	○	○	○	○	○	①	
0	29	21	Phase 1 harmonic current	A	Inst.	13th	○	○	○	○	○	○	①	
1	2B	21	Phase 1 harmonic current	A	Inst.	15th	○	○	○	–	–	–	①	
1	2D	21	Phase 1 harmonic current	A	Inst.	17th	○	○	○	–	–	–	①	
1	2F	21	Phase 1 harmonic current	A	Inst.	19th	○	○	○	–	–	–	①	
1	31	21	Phase 1 harmonic current	A	Inst.	21st	○	○	○	–	–	–	①	
1	78	02	Phase 1 harmonic current	A	Inst.	23rd	○	○	○	–	–	–	①	
1	78	04	Phase 1 harmonic current	A	Inst.	25th	○	○	○	–	–	–	①	
1	78	06	Phase 1 harmonic current	A	Inst.	27th	○	○	○	–	–	–	①	
1	78	08	Phase 1 harmonic current	A	Inst.	29th	○	○	○	–	–	–	①	
1	78	0A	Phase 1 harmonic current	A	Inst.	31st	○	○	○	–	–	–	①	
0	75	86	Phase 1 current THD	%	Inst.	Total	○	○	○	○	○	○	①	
1/0	75	73	Phase 1 current harmonic distortion	%	Inst.	3rd	○	○	○	○	○	○	①	*2
1/0	75	75	Phase 1 current harmonic distortion	%	Inst.	5th	○	○	○	○	○	○	①	*2
1/0	75	77	Phase 1 current harmonic distortion	%	Inst.	7th	○	○	○	○	○	○	①	*2
1/0	75	79	Phase 1 current harmonic distortion	%	Inst.	9th	○	○	○	○	○	○	①	*2
1/0	75	7B	Phase 1 current harmonic distortion	%	Inst.	11th	○	○	○	○	○	○	①	*2
1/0	75	7D	Phase 1 current harmonic distortion	%	Inst.	13th	○	○	○	○	○	○	①	*2
1	75	7F	Phase 1 current harmonic distortion	%	Inst.	15th	○	○	○	–	–	–	①	
1	75	81	Phase 1 current harmonic distortion	%	Inst.	17th	○	○	○	–	–	–	①	
1	75	83	Phase 1 current harmonic distortion	%	Inst.	19th	○	○	○	–	–	–	①	
1	75	85	Phase 1 current harmonic distortion	%	Inst.	21st	○	○	○	–	–	–	①	
1	78	72	Phase 1 current harmonic distortion	%	Inst.	23rd	○	○	○	–	–	–	①	
1	78	74	Phase 1 current harmonic distortion	%	Inst.	25th	○	○	○	–	–	–	①	
1	78	76	Phase 1 current harmonic distortion	%	Inst.	27th	○	○	○	–	–	–	①	
1	78	78	Phase 1 current harmonic distortion	%	Inst.	29th	○	○	○	–	–	–	①	
1	78	7A	Phase 1 current harmonic distortion	%	Inst.	31st	○	○	○	–	–	–	①	

Table 7.9 Group Channel List (8/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	33	41	Phase 2 harmonic current	A	Inst.	Total	○	△	−	○	△	−	①	*1
0	1D	41	Phase 2 harmonic current	A	Inst.	1st	○	△	−	○	△	−	①	*1
0	1F	41	Phase 2 harmonic current	A	Inst.	3rd	○	△	−	○	△	−	①	*1
0	21	41	Phase 2 harmonic current	A	Inst.	5th	○	△	−	○	△	−	①	*1
0	23	41	Phase 2 harmonic current	A	Inst.	7th	○	△	−	○	△	−	①	*1
0	25	41	Phase 2 harmonic current	A	Inst.	9th	○	△	−	○	△	−	①	*1
0	27	41	Phase 2 harmonic current	A	Inst.	11th	○	△	−	○	△	−	①	*1
0	29	41	Phase 2 harmonic current	A	Inst.	13th	○	△	−	○	△	−	①	*1
1	2B	41	Phase 2 harmonic current	A	Inst.	15th	○	△	−	−	−	−	①	*1
1	2D	41	Phase 2 harmonic current	A	Inst.	17th	○	△	−	−	−	−	①	*1
1	2F	41	Phase 2 harmonic current	A	Inst.	19th	○	△	−	−	−	−	①	*1
1	31	41	Phase 2 harmonic current	A	Inst.	21st	○	△	−	−	−	−	①	*1
1	78	18	Phase 2 harmonic current	A	Inst.	23rd	○	△	−	−	−	−	①	*1
1	78	1A	Phase 2 harmonic current	A	Inst.	25th	○	△	−	−	−	−	①	*1
1	78	1C	Phase 2 harmonic current	A	Inst.	27th	○	△	−	−	−	−	①	*1
1	78	1E	Phase 2 harmonic current	A	Inst.	29th	○	△	−	−	−	−	①	*1
1	78	20	Phase 2 harmonic current	A	Inst.	31st	○	△	−	−	−	−	①	*1
0	75	9C	Phase 2 current THD	%	Inst.	Total	○	△	−	○	△	−	①	*1
1/0	75	89	Phase 2 current harmonic distortion	%	Inst.	3rd	○	△	−	○	△	−	①	*1,*2
1/0	75	8B	Phase 2 current harmonic distortion	%	Inst.	5th	○	△	−	○	△	−	①	*1,*2
1/0	75	8D	Phase 2 current harmonic distortion	%	Inst.	7th	○	△	−	○	△	−	①	*1,*2
1/0	75	8F	Phase 2 current harmonic distortion	%	Inst.	9th	○	△	−	○	△	−	①	*1,*2
1/0	75	91	Phase 2 current harmonic distortion	%	Inst.	11th	○	△	−	○	△	−	①	*1,*2
1/0	75	93	Phase 2 current harmonic distortion	%	Inst.	13th	○	△	−	○	△	−	①	*1,*2
1	75	95	Phase 2 current harmonic distortion	%	Inst.	15th	○	△	−	−	−	−	①	*1
1	75	97	Phase 2 current harmonic distortion	%	Inst.	17th	○	△	−	−	−	−	①	*1
1	75	99	Phase 2 current harmonic distortion	%	Inst.	19th	○	△	−	−	−	−	①	*1
1	75	9B	Phase 2 current harmonic distortion	%	Inst.	21st	○	△	−	−	−	−	①	*1
1	78	88	Phase 2 current harmonic distortion	%	Inst.	23rd	○	△	−	−	−	−	①	*1
1	78	8A	Phase 2 current harmonic distortion	%	Inst.	25th	○	△	−	−	−	−	①	*1
1	78	8C	Phase 2 current harmonic distortion	%	Inst.	27th	○	△	−	−	−	−	①	*1
1	78	8E	Phase 2 current harmonic distortion	%	Inst.	29th	○	△	−	−	−	−	①	*1
1	78	90	Phase 2 current harmonic distortion	%	Inst.	31st	○	△	−	−	−	−	①	*1
0	33	61	Phase 3 harmonic current	A	Inst.	Total	○	○	−	○	○	−	①	
0	1D	61	Phase 3 harmonic current	A	Inst.	1st	○	○	−	○	○	−	①	
0	1F	61	Phase 3 harmonic current	A	Inst.	3rd	○	○	−	○	○	−	①	
0	21	61	Phase 3 harmonic current	A	Inst.	5th	○	○	−	○	○	−	①	
0	23	61	Phase 3 harmonic current	A	Inst.	7th	○	○	−	○	○	−	①	
0	25	61	Phase 3 harmonic current	A	Inst.	9th	○	○	−	○	○	−	①	
0	27	61	Phase 3 harmonic current	A	Inst.	11th	○	○	−	○	○	−	①	
0	29	61	Phase 3 harmonic current	A	Inst.	13th	○	○	−	○	○	−	①	
1	2B	61	Phase 3 harmonic current	A	Inst.	15th	○	○	−	−	−	−	①	
1	2D	61	Phase 3 harmonic current	A	Inst.	17th	○	○	−	−	−	−	①	
1	2F	61	Phase 3 harmonic current	A	Inst.	19th	○	○	−	−	−	−	①	
1	31	61	Phase 3 harmonic current	A	Inst.	21st	○	○	−	−	−	−	①	
1	78	2E	Phase 3 harmonic current	A	Inst.	23rd	○	○	−	−	−	−	①	
1	78	30	Phase 3 harmonic current	A	Inst.	25th	○	○	−	−	−	−	①	
1	78	32	Phase 3 harmonic current	A	Inst.	27th	○	○	−	−	−	−	①	
1	78	34	Phase 3 harmonic current	A	Inst.	29th	○	○	−	−	−	−	①	
1	78	36	Phase 3 harmonic current	A	Inst.	31st	○	○	−	−	−	−	①	

Table 7.10 Group Channel List (9/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	75	B2	Phase 3 current THD	%	Inst.	Total	○	○	－	○	○	－	①	
1/0	75	9F	Phase 3 current harmonic distortion	%	Inst.	3rd	○	○	－	○	○	－	①	*2
1/0	75	A1	Phase 3 current harmonic distortion	%	Inst.	5th	○	○	－	○	○	－	①	*2
1/0	75	A3	Phase 3 current harmonic distortion	%	Inst.	7th	○	○	－	○	○	－	①	*2
1/0	75	A5	Phase 3 current harmonic distortion	%	Inst.	9th	○	○	－	○	○	－	①	*2
1/0	75	A7	Phase 3 current harmonic distortion	%	Inst.	11th	○	○	－	○	○	－	①	*2
1/0	75	A9	Phase 3 current harmonic distortion	%	Inst.	13th	○	○	－	○	○	－	①	*2
1	75	AB	Phase 3 current harmonic distortion	%	Inst.	15th	○	○	－	－	－	－	①	
1	75	AD	Phase 3 current harmonic distortion	%	Inst.	17th	○	○	－	－	－	－	①	
1	75	AF	Phase 3 current harmonic distortion	%	Inst.	19th	○	○	－	－	－	－	①	
1	75	B1	Phase 3 current harmonic distortion	%	Inst.	21st	○	○	－	－	－	－	①	
1	78	9E	Phase 3 current harmonic distortion	%	Inst.	23rd	○	○	－	－	－	－	①	
1	78	A0	Phase 3 current harmonic distortion	%	Inst.	25th	○	○	－	－	－	－	①	
1	78	A2	Phase 3 current harmonic distortion	%	Inst.	27th	○	○	－	－	－	－	①	
1	78	A4	Phase 3 current harmonic distortion	%	Inst.	29th	○	○	－	－	－	－	①	
1	78	A6	Phase 3 current harmonic distortion	%	Inst.	31st	○	○	－	－	－	－	①	
0	33	81	Phase N harmonic current	A	Inst.	Total	○	－	－	○	－	－	①	
0	1D	81	Phase N harmonic current	A	Inst.	1st	○	－	－	○	－	－	①	
0	1F	81	Phase N harmonic current	A	Inst.	3rd	○	－	－	○	－	－	①	
0	21	81	Phase N harmonic current	A	Inst.	5th	○	－	－	○	－	－	①	
0	23	81	Phase N harmonic current	A	Inst.	7th	○	－	－	○	－	－	①	
0	25	81	Phase N harmonic current	A	Inst.	9th	○	－	－	○	－	－	①	
0	27	81	Phase N harmonic current	A	Inst.	11th	○	－	－	○	－	－	①	
0	29	81	Phase N harmonic current	A	Inst.	13th	○	－	－	○	－	－	①	
1	2B	81	Phase N harmonic current	A	Inst.	15th	○	－	－	－	－	－	①	
1	2D	81	Phase N harmonic current	A	Inst.	17th	○	－	－	－	－	－	①	
1	2F	81	Phase N harmonic current	A	Inst.	19th	○	－	－	－	－	－	①	
1	31	81	Phase N harmonic current	A	Inst.	21st	○	－	－	－	－	－	①	
1	78	44	Phase N harmonic current	A	Inst.	23rd	○	－	－	－	－	－	①	
1	78	46	Phase N harmonic current	A	Inst.	25th	○	－	－	－	－	－	①	
1	78	48	Phase N harmonic current	A	Inst.	27th	○	－	－	－	－	－	①	
1	78	4A	Phase N harmonic current	A	Inst.	29th	○	－	－	－	－	－	①	
1	78	4C	Phase N harmonic current	A	Inst.	31st	○	－	－	－	－	－	①	
1	33	82	Phase N current THD	A	max.	Total	○	－	－	○	－	－	①	
1	1D	82	Phase N current harmonic distortion	A	max.	1st	○	－	－	○	－	－	①	
1	1F	82	Phase N current harmonic distortion	A	max.	3rd	○	－	－	○	－	－	①	
1	21	82	Phase N current harmonic distortion	A	max.	5th	○	－	－	○	－	－	①	
1	23	82	Phase N current harmonic distortion	A	max.	7th	○	－	－	○	－	－	①	
1	25	82	Phase N current harmonic distortion	A	max.	9th	○	－	－	○	－	－	①	
1	27	82	Phase N current harmonic distortion	A	max.	11th	○	－	－	○	－	－	①	
1	29	82	Phase N current harmonic distortion	A	max.	13th	○	－	－	○	－	－	①	
1	2B	82	Phase N current harmonic distortion	A	max.	15th	○	－	－	－	－	－	①	
1	2D	82	Phase N current harmonic distortion	A	max.	17th	○	－	－	－	－	－	①	
1	2F	82	Phase N current harmonic distortion	A	max.	19th	○	－	－	－	－	－	①	
1	31	82	Phase N current harmonic distortion	A	max.	21st	○	－	－	－	－	－	①	
1	7B	44	Phase N current harmonic distortion	A	max.	23rd	○	－	－	－	－	－	①	
1	7B	46	Phase N current harmonic distortion	A	max.	25th	○	－	－	－	－	－	①	
1	7B	48	Phase N current harmonic distortion	A	max.	27th	○	－	－	－	－	－	①	
1	7B	4A	Phase N current harmonic distortion	A	max.	29th	○	－	－	－	－	－	①	
1	7B	4C	Phase N current harmonic distortion	A	max.	31st	○	－	－	－	－	－	①	

Table 7.11 Group Channel List (10/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	33	A2	Harmonic current	A	max.	Total	○	○	○	○	○	○	①	
0	1D	A2	Harmonic current	A	max.	1st	○	○	○	○	○	○	①	
0	1F	A2	Harmonic current	A	max.	3rd	○	○	○	○	○	○	①	
0	21	A2	Harmonic current	A	max.	5th	○	○	○	○	○	○	①	
0	23	A2	Harmonic current	A	max.	7th	○	○	○	○	○	○	①	
0	25	A2	Harmonic current	A	max.	9th	○	○	○	○	○	○	①	
0	27	A2	Harmonic current	A	max.	11th	○	○	○	○	○	○	①	
0	29	A2	Harmonic current	A	max.	13th	○	○	○	○	○	○	①	
1	2B	A2	Harmonic current	A	max.	15th	○	○	○	－	－	－	①	
1	2D	A2	Harmonic current	A	max.	17th	○	○	○	－	－	－	①	
1	2F	A2	Harmonic current	A	max.	19th	○	○	○	－	－	－	①	
1	31	A2	Harmonic current	A	max.	21st	○	○	○	－	－	－	①	
1	78	5A	Harmonic current	A	max.	23rd	○	○	○	－	－	－	①	
1	78	5C	Harmonic current	A	max.	25th	○	○	○	－	－	－	①	
1	78	5E	Harmonic current	A	max.	27th	○	○	○	－	－	－	①	
1	78	60	Harmonic current	A	max.	29th	○	○	○	－	－	－	①	
1	78	62	Harmonic current	A	max.	31st	○	○	○	－	－	－	①	
0	80	01	Active energy import	kWh	count		○	○	○	○	○	○	②	*3
0	80	63	Active energy export	kWh	count		○	○	○	○	○	○	②	*3
0	80	64	Active energy import	kWh	count	expand	○	○	○	○	○	○	②	*3
0	80	65	Active energy export	kWh	count	expand	○	○	○	○	○	○	②	*3
0	81	01	Reactive energy import lag	kvarh	count		○	○	○	○	○	○	②	*3
0	81	63	Reactive energy export lag	kvarh	count		○	○	○	○	○	○	②	*3
0	81	64	Reactive energy import lead	kvarh	count		○	○	○	○	○	○	②	*3
0	81	65	Reactive energy export lead	kvarh	count		○	○	○	○	○	○	②	*3
0	81	66	Reactive energy import lag	kvarh	count	expand	○	○	○	○	○	○	②	*3
0	81	67	Reactive energy export lag	kvarh	count	expand	○	○	○	○	○	○	②	*3
0	81	68	Reactive energy import lead	kvarh	count	expand	○	○	○	○	○	○	②	*3
0	81	69	Reactive energy export lead	kvarh	count	expand	○	○	○	○	○	○	②	*3
0	82	01	Apparent energy	kVAh	count		○	－	－	－	－	－	②	*3
0	8B	01	Periodic active energy(Period 1)	kWh	count		○	○	○	○	○	○	②	*3
0	8C	01	Periodic active energy(Period 2)	kWh	count		○	○	○	○	○	○	②	*3
0	87	01	Operating time1	h	count		○	○	○	○	○	○	②	
0	88	01	Operating time2	h	count		○	○	○	○	○	○	②	
1	B0	01	Active energy import	Wh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	04	Active energy export	Wh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	07	Reactive energy import lag	varh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	0A	Reactive energy export lag	varh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	0D	Reactive energy import lead	varh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	10	Reactive energy export lead	varh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	13	Apparent energy	VAh	count	unit fixed	○	－	－	－	－	－	③	*3
1	B0	16	Periodic active energy(Period 1)	Wh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	19	Periodic active energy(Period 2)	Wh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	02	Active energy import	kWh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	05	Active energy export	kWh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	08	Reactive energy import lag	kvarh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	0B	Reactive energy export lag	kvarh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	0E	Reactive energy import lead	kvarh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	11	Reactive energy export lead	kvarh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	14	Apparent energy	kVAh	count	unit fixed	○	－	－	－	－	－	③	*3
1	B0	17	Periodic active energy(Period 1)	kWh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	1A	Periodic active energy(Period 2)	kWh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	03	Active energy import	MWh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	06	Active energy export	MWh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	09	Reactive energy import lag	Mvarh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	0C	Reactive energy export lag	Mvarh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	0F	Reactive energy import lead	Mvarh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	12	Reactive energy export lead	Mvarh	count	unit fixed	○	－	－	－	－	－	③	*3
1	B0	15	Apparent energy	MVAh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	18	Periodic active energy(Period 1)	MWh	count	unit fixed	○	○	○	○	○	○	③	*3
1	B0	1B	Periodic active energy(Period 2)	MWh	count	unit fixed	○	○	○	○	○	○	③	*3

Table 7.12 Group Channel List (11/11)

Unit No.	Group (h)	Channel (h)	Name of Cannel				ME96SSH-MB			ME96SSR-MB			Data type	Note
							3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
0	01	14	Current upper limit	A	Alarm		○	○	○	○	○	○	①	
0	01	15	Current lower limit	A	Alarm		○	○	○	○	○	○	①	
0	01	94	Current upper limit	A	Alarm	PhaseN	○	－	－	○	－	－	①	
0	02	14	Current demand upper limit	A	Alarm		○	○	○	○	○	○	①	
0	02	15	Current demand lower limit	A	Alarm		○	○	○	○	○	○	①	
0	02	94	Current demand upper limit	A	Alarm	PhaseN	○	－	－	○	－	－	①	
0	05	14	Voltage upper limit（L-L）	V	Alarm		○	○	○	○	○	○	①	
0	05	15	Voltage lower limit（L-L）	V	Alarm		○	○	○	○	○	○	①	
0	03	14	Voltage upper limit（L-N）	V	Alarm		○	○	○	○	○	○	①	
0	03	15	Voltage lower limit（L-N）	V	Alarm		○	○	○	○	○	○	①	
0	07	14	Active power upper limit	kW	Alarm		○	○	○	○	○	○	①	
0	07	15	Active power lower limit	kW	Alarm		○	○	○	○	○	○	①	
0	08	14	Rolling demand upper limit	kW	Alarm		○	○	○	－	－	－	①	
0	09	14	Reactive power upper limit	kvar	Alarm		○	○	○	○	○	○	①	
0	09	15	Reactive power lower limit	kvar	Alarm		○	○	○	○	○	○	①	
0	0D	14	Power factor upper limit	%	Alarm		○	○	○	○	○	○	①	
0	0D	15	Power factor lower limit	%	Alarm		○	○	○	○	○	○	①	
0	0F	14	Frequency upper limit	Hz	Alarm		○	○	○	○	○	○	①	
0	0F	15	Frequency lower limit	Hz	Alarm		○	○	○	○	○	○	①	
0	77	E1	H.V(L-N) upper limit	%	Alarm	Total	○	○	○	○	○	○	①	
0	76	E1	H.V(L-L) upper limit	%	Alarm	Total	○	○	○	○	○	○	①	
0	75	E1	H.A upper limit	A	Alarm	Total	○	○	○	○	○	○	①	
0	75	F1	H.A upper limit(Phase N)	A	Alarm	Total	○	－	－	○	－	－	①	
0	A0	31	Alarm state		Alarm		○	○	○	○	○	○	④	
0	A0	35	Alarm state2		Alarm		○	○	○	○	○	○	④	

Inst.: Instantaneous value, max.: maximum value, min.: minimum value.

*1: △ in the table means that it is applicable when the setting of phase wiring is 3P3W_3CT only.

*2: Unit number is “0” when the setting of phase wiring is 1P2W, 1P3W or 3P3W.

*3: About the reply data of active energy(Wh), reactive energy(varh) and apparent energy(VAh), refer to follows.

Example) In case of active energy(import) data is 876,543,210,987,654,321mWh, each reply data are follows.

					GWh				MWh			kWh			Wh			mWh		
				Data=	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	
Unit No.	Group (h)	Channel (h)	Name of Cannel	Total power[kW]																			Note
0	80	01	Active energy import	less than 10									0	9	8	7	6	5					
				10 or more and less than 100								1	0	9	8	7	6						
				100 or more and less than 1000							2	1	0	9	8	7							
				1000 or more and less than 10000						3	2	1	0	9	8								
				10000 or more and less than 100000					4	3	2	1	0	9									
				100000 or more				5	4	3	2	1	0										*1
0	80	64	Active energy import (expand)	less than 10												7	6	5	4	3	2		
				10 or more and less than 100											8	7	6	5	4	3			
				100 or more and less than 1000										9	8	7	6	5	4				
				1000 or more and less than 10000									0	9	8	7	6	5					
				10000 or more and less than 100000								1	0	9	8	7	6						
				100000 or more							2	1	0	9	8	7							
1	B0	01	Active energy import (unit fixed: Wh)	-							2	1	0	9	8	7	6	5	4				
1	B0	02	Active energy import (unit fixed: kWh)	-				5	4	3	2	1	0	9	8	7							*2
1	B0	03	Active energy import (unit fixed: MWh)	-	8	7	6	5	4	3	2	1	0										

*1: The data of energy wil change according to the total load setting of ME96. (This matches to display of ME96NSR.) Multiplying the receving data by the multiplying factor of section gives the actual value (unit:kWh).

*2: The data of energy of selected unit will reply regardless to the total load setting of ME96. (This matches to the additional display(9 digits) of ME96SSH/ME96SSR.

7.2.3 When Setting by Command(2H)

Settings of ME96 can be set by communication.

Monitor pattern setting flag(RX(n+1)0) is used to send the command. (For details, refer to section 6.4.2)

The command can be sent only when the remote READY(RX(n+7)B) is ON.

2H	Data Set

Remote register RWw (Programmable controller→ME96)

	b15 b8	b7 b0
RWw00	Group No.	0H 2H
RWw01	Index number	Channel No.
RWw02	Low data	
RWw03	High data	
RWw04	00H	00H
RWw05	00H	00H
RWw06	00H	00H
RWw07	00H	00H
to	to	
RWw1C	00H	00H
RWw1D	00H	00H
RWw1E	00H	00H
RWw1F	00H	00H

Remote register RWw (ME96→Programmable controller)

	b15 b8	b7 b0
RWr00	Channel No.	Group No.
RWr01	00H	(Error code)
RWr02	00H	00H
RWr03	00H	00H
RWr04	00H	00H
RWr05	00H	00H
RWr06	00H	00H
RWr07	00H	00H
to	to	
RWr1C	00H	00H
RWr1D	00H	00H
RWr1E	00H	00H
RWr1F	00H	00H

* At normal communication, Error code is 00h.
About the other error code, refer to Table 7.23.

* At data set, Unit No. is fixed 0H in ME96.

- A setting item of ME96 can be set by storing Group No., Channel No. and setting data to remote register(RWw).
- About Group No. and Channel No., refer to Table 7.2 to Table 7.12)
- The details of data format are shown in the Table 7.14 to Table 7.21

* After writing the set-up value, about 2 seconds (max 4 seconds) is needed to restart the measurement based on new set-up value.

Table 7.13 List of Group and Channel for Setting

Group (h)	Channel (h)	Name of Cannel	Setting range	ME96SSH-MB			ME96SSR-MB			Data type	Note
				3P4W	3P3W 1P3W	1P2W	3P4W	3P3W 1P3W	1P2W		
E0	11	Primary current	1.0A to 30000.0A	○	○	○	○	○	○	⑤	*1
E0	12	Primary voltage(L-L)	60V～750000V	○	○	○	○	○	○	⑤	*2
E0	1B	Primary voltage(L-N)	60V～750000V	○	–	–	○	–	–	⑤	*3
E0	1C	Scondary voltage	(Refer to *4)	○	○	○	○	○	○	⑤	*4
E0	13	Phase wiring	Refer to data type ⑥	○	○	○	○	○	○	⑥	
E0	1D	Frequency	50Hz, 60Hz	○	○	○	○	○	○	⑤	
E0	1E	Secondary current	5A, 1A	○	○	○	○	○	○	⑤	
E0	18	Alarm items	Refer to data type ⑦	○	○	○	○	○	○	⑦	
02	E0	Time constant for current demand	0 to 1800 sec.	○	○	○	○	○	○	⑥	*5
08	E4	Interval time constant	1 to 60 min	○	○	○	–	–	–	⑥	*6
08	E5	Subinterval time constant	1 to 60 min	○	○	○	–	–	–	⑥	*6
80	01	Active energy import	0 to 999999 x Multiplying	○	○	○	○	○	○	②	*7
80	63	Active energy export	0 to 999999 x Multiplying	○	○	○	○	○	○	②	*7
81	01	Reactive energy import lag	0 to 999999 x Multiplying	○	○	○	○	○	○	②	*7
81	63	Reactive energy export lag	0 to 999999 x Multiplying	○	○	○	○	○	○	②	*7
81	64	Reactive energy import lead	0 to 999999 x Multiplying	○	○	○	○	○	○	②	*7
81	65	Reactive energy export lead	0 to 999999 x Multiplying	○	○	○	○	○	○	②	*7
82	01	Apparent energy	0 to 999999 x Multiplying	○	–	–	–	–	–	②	*7
8B	01	Periodic active energy(Period 1)	0 to 999999 x Multiplying	○	○	○	○	○	○	②	*7
8C	01	Periodic active energy(Period 2)	0 to 999999 x Multiplying	○	○	○	○	○	○	②	*7
01	14	Current upper limit	5 to 120% (1% step)	○	○	○	○	○	○	①	*8
01	15	Current lower limit	3 to 95% (1% step)	○	○	○	○	○	○	①	*8
01	94	Current upper limit(Phase N)	5 to 120% (1% step)	○	–	–	○	–	–	①	*8
02	14	Current demand upper limit	5 to 120% (1% step)	○	○	○	○	○	○	①	*8
02	15	Current demand lower limit	3 to 95% (1% step)	○	○	○	○	○	○	①	*8
02	94	Current demand upper limit (Phase N)	5 to 120% (1% step)	○	–	–	○	–	–	①	*8
05	14	Voltage upper limit（L-L）	25 to 135% (1% step)	○	○	○	○	○	○	①	*8
05	15	Voltage lower limit（L-L）	20 to 95% (1% step)	○	○	○	○	○	○	①	*8
03	14	Voltage upper limit（L-N）	25 to 135% (1% step)	○	○	○	○	○	○	①	*8
03	15	Voltage lower limit（L-N）	20 to 95% (1% step)	○	○	○	○	○	○	①	*8
07	14	Active power upper limit	-95 to 120% (1% step)	○	○	○	○	○	○	①	*8
07	15	Active power lower limit	-120 to 95% (1% step)	○	○	○	○	○	○	①	*8
08	14	Rolling demand upper limit	5 to 120% (1% step)	○	○	○	–	–	–	①	*8
09	14	Reactive power upper limit	-95 to 120% (1% step)	○	○	○	○	○	○	①	*8
09	15	Reactive power lower limit	-120 to 95% (1% step)	○	○	○	○	○	○	①	*8
0D	14	Power factor upper limit	-0.05 to 1 to 0.05 (0.05 step)	○	○	○	○	○	○	①	*8
0D	15	Power factor lower limit	-0.05 to 1 to 0.05 (0.05 step)	○	○	○	○	○	○	①	*8
0F	14	Frequency upper limit	45 to 65Hz (1Hz step)	○	○	○	○	○	○	①	*8
0F	15	Frequency lower limit	45 to 65Hz (1Hz step)	○	○	○	○	○	○	①	*8
77	E1	H.V(L-N) upper limit	0.5 to 20% (0.5% step)	○	○	○	○	○	○	①	*8
76	E1	H.V(L-L) upper limit	0.5 to 20% (0.5% step)	○	○	○	○	○	○	①	*8
75	E1	H.A upper limit	1 to 120% (1% step)	○	○	○	○	○	○	①	*8
75	F1	H.A upper limit(Phase N)	1 to 120% (1% step)	○	–	–	○	–	–	①	*8
A1	3A	16bit set register 1	Refer to data type ⑧	○	○	○	○	○	○	⑧	
A1	3B	16bit set register 2	Refer to data type ⑧	○	○	○	○	○	○	⑧	

*1: From the most significant digit to 3 digits can be freely setting in the range. Digits of 4 or more are rounded down to 3 digits. (When less than 10A, to 2 digits.)
In details of setting data and setting ranges, please refer each user's manuals.

*2: Effective value of primary voltage(L-L) is follows.

- 3P4W

  It is valid only 190V, 415V, 440V. And it changed as follows by set value.

Set value	Using VT/ Direct input	Direct voltage	VT secondary voltage	VT primary voltage
190V	Direct input	110V/190V	—	—
415V	Using VT	—	63.5V/110V	240V/415V
440V	Using VT	—	63.5V/110V	254V/440V

- 3P3W or 1P2W
  - Set a direct voltage value (Ex. 110V, 220V etc.).
    It is set “Direct input”, and set the primary voltage which is transmitted as the direct input voltage.
  - Set within the range of from 60V to 750000V.
    It is set “Using VT”, and set the primary voltage which is transmitted. From the most significant digit to 3 figures can be freely set up in the range.
- 1P3W
  110V or 220V is valid only.

*3: Effective value of primary voltage(L-N) is follows.

- 3P4W
  - Set a direct voltage value (Ex. 63.5V, 100V, 110V, 220V, 240V, 254V or 277V)
    It is set “Direct input”, and set the primary voltage which is transmitted as the direct input voltage.
  - Set within the range from 60V to 750000V.
    It is set “Using VT”, and set the primary voltage which is transmitted. From the most significant digit to 3 figures can be freely set up in the range.
- 3P3W, 1P3W or 1P2W
  It is unsupported. Use the primary voltage value (L-L) (*2).

*4: Effective value of secondary voltage is follows.

- 3P4W, 3P3W or 1P2W
  About setting range, please refer to each user’s manuals.
  In case of 3P4W, set the voltage of L-N. In case of 3P3W, set the voltage of L-L. If the setting of ME96 is “Direct voltage”, the setting is changed “With VT” and set the secondary voltage. Furthermore, the setting of the primary voltage is changed to the initial value or the previous value.
- 1P3W
  It is unsupported.

*5: The set value is the second unit value. (For example of 2 miniutes, sets as 120 seconds.) About setting range, please refer to each user’s manuals.

*6: When the interval time constant is changed, the subinterval time constant is changed to 1 min. When the subinterval is changed, if the interval time constant cannot be divided by subinterval time constant, it will be the error of illegal data value.

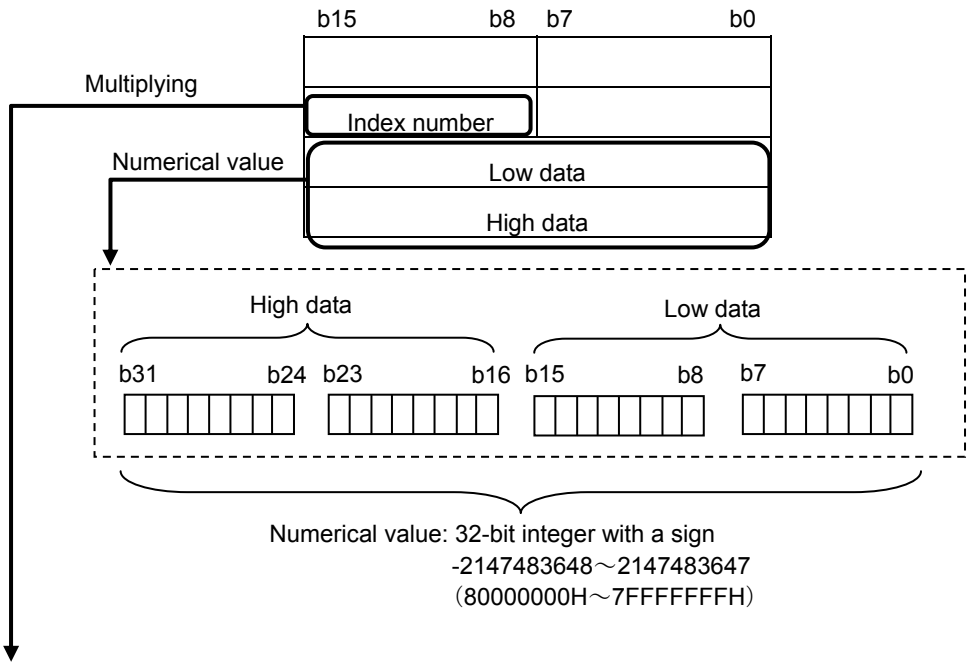
*7: Multiplying factor differs according to settings of phase wiring, primary voltage and primary current. For details, refer to.7.2.5.

*8: About setting of upper/lower limit value.

- About setting range, please refer to each user’s manuals.
- Setting of upper/lower limit value is not a percentage value of maximum scale but a direct value.
  (In case of current harmonic and phase N current harmonic, use a percentage value for the maximum scale.)
- When the setting value is other than setting step, it is rounded according to following calculation.
  Calculate: Setting value via CC-Link / maximum scale (±0step) x 100 → Rounds to the whole number.
  Example: In case of setting value is 55.5kW, maximum scale (±0step) is 100kW.
  55.5kW / 100kW x100 = 55.5% → 56%
- When out of range is set, the error code of invalid data is replied, and setting value is not changed.
- If the upper/lower limit value of W, DW and var exceeds ±1638.3MW(Mvar), please set by the main device.

7.2.4 Data format of Monitoring by Command(1H) and Setting by Command(2H)

Table 7.14 Data Format (1/8)

Data	Data Format ①
Measurement Items Current, Voltage, Active power, Reactive power, Apparent power, Power factor, Frequency, etc. Format①	 Numerical value: 32-bit integer with a sign -2147483648～2147483647 （80000000H～7FFFFFFFH） ＜Multiplying factor＞ Multiplying factor is fixed according to settings of primary current, primary voltage, and phase wiring. (Refer to 7.2.5.)

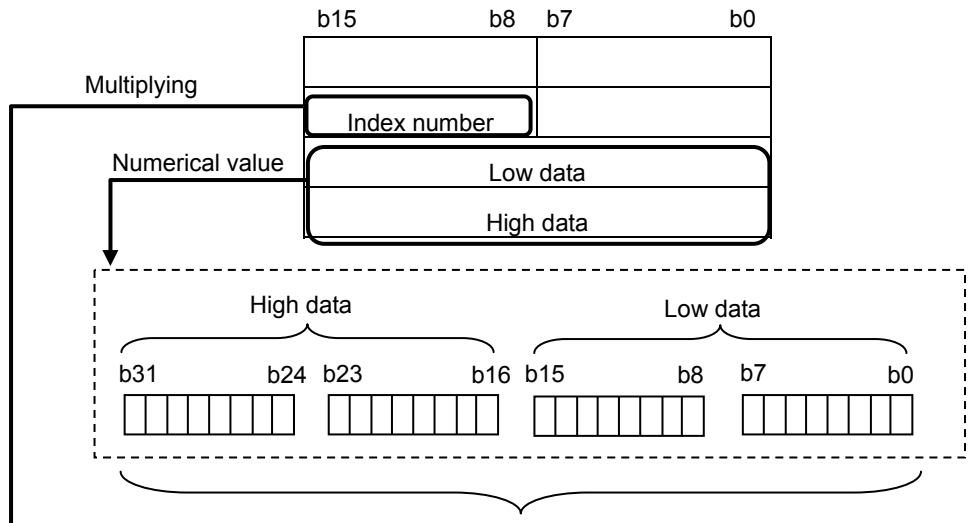
Index number	Multiplying factor	Remarks
02H	$\times 10^{2}$	Actual value = Numerical value × Multiplying factor
01H	×10	
00H	×1	
FFH	$\times 10^{-1}$	
FEH	$\times 10^{-2}$	
FDH	$\times 10^{-3}$	

＜Example: Active power＞

Data	Multiplying factor	Numerical value	Actual value
FF000000FFH	FFH⇒$\times 10^{-1}$	000000FFH⇒255	255×10^{-1}= 25.5[kW]
00000000FFH	00H⇒×1	000000FFH⇒255	255×1 = 255[kW]
FFFFFFFF01H	FFH⇒$\times 10^{-1}$	FFFFFF01H⇒-255	-255×10^{-1}= -25.5[kW]
00FFFFFF01H	00H⇒×1	FFFFFF01H⇒-255	-255×1 = -255[kW]

Note: For the active power (demand) and reactive power, ±1638.3MW(Mvar) becomes the upper(lower) value.
Note: For the power factor, “+” is showed lag, “-“ is showed lead as with ME96’s display.

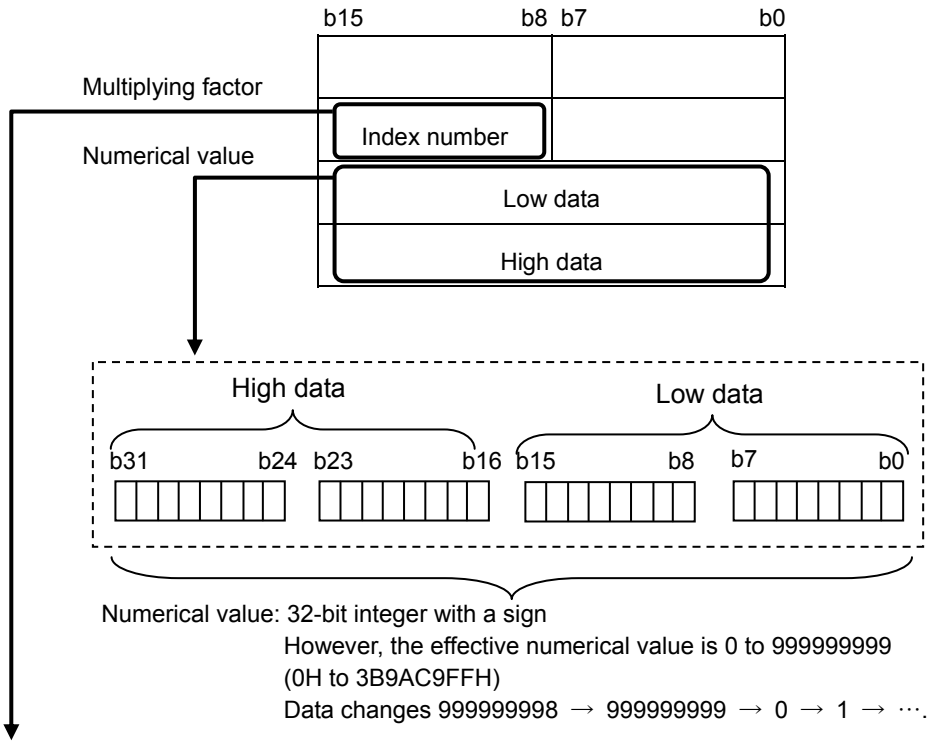
Table 7.15 Data Format (2/8)

Data	Data Format ②
Measurement Items Active energy, Reactive energy, Apparent energy, Operation time, etc. Format②	 Numerical value: 32-bit integer with a sign However, the effective numerical value is 0 to 999999(0H to F423FH) Data changes 999998 → 999999 → 0 → 1 → …. (Operation time stops at 999999.) ＜Multiplying factor＞ Multiplying factor is fixed according to settings of primary current, primary voltage, and phase wire system. (Refer to 7.2.5.) Actual value = Numerical value × Multiplying factor ＜Example: Active Energy＞ Note: For active energy (export), reactive energy (export/Lag) and reactive energy (export/Lead), the reply data are unsigned although the display of main device has a "-"(negative) sign.

Index number	Multiplying factor	Remarks
03H	$x10^{3}$	
02H	$x10^{2}$	
01H	x10	
00H	x1	
FFH	$x10^{-1}$	
FEH	$x10^{-2}$	
FDH	$x10^{-3}$	
FCH	$x10^{-4}$	
FBH	$x10^{-5}$	

Data	Multiplying factor	Numerical value	Actual value
FF000000FFH	FFH⇒$x10^{-1}$	000000FFH⇒255	$255x10^{-1}$ = 25.5[kWh]
00000000FFH	00H⇒x1	000000FFH⇒255	255x1 = 255[kWh]

Table 7.16 Data Format (3/8)

Data	Data Format ③
Measurement Items (Active energy, Reactive energy, Apparent energy, (unit fixed)) Format③	 Numerical value: 32-bit integer with a sign However, the effective numerical value is 0 to 999999999 (0H to 3B9AC9FFH) Data changes 999999998 → 999999999 → 0 → 1 → …. <Multiplying factor> Multiplying factor is fixed by the channel number.

	Index number	Multiplying factor	Remarks
MWh, Mvarh, MVAh unit fixed	03H	$x10^{3}$	Actual value = Numerical value x Multiplying factor [kWh],[kvarh],[kVAh]
kWh, kvarh, kVAh unit fixed	00H	x1	
Wh, varh, VAh unit fixed	FDH	$x10^{-3}$	

<Example : Active energy unit fixed:Wh>

Data	Multiplying factor	Numerical value	Actual value
FD3ADE68B1H	FDH ⇒$x10^{-3}$	FD3ADE68B1H ⇒987654321	987654321[Wh] × 10^{-3} =987654.321[kWh]

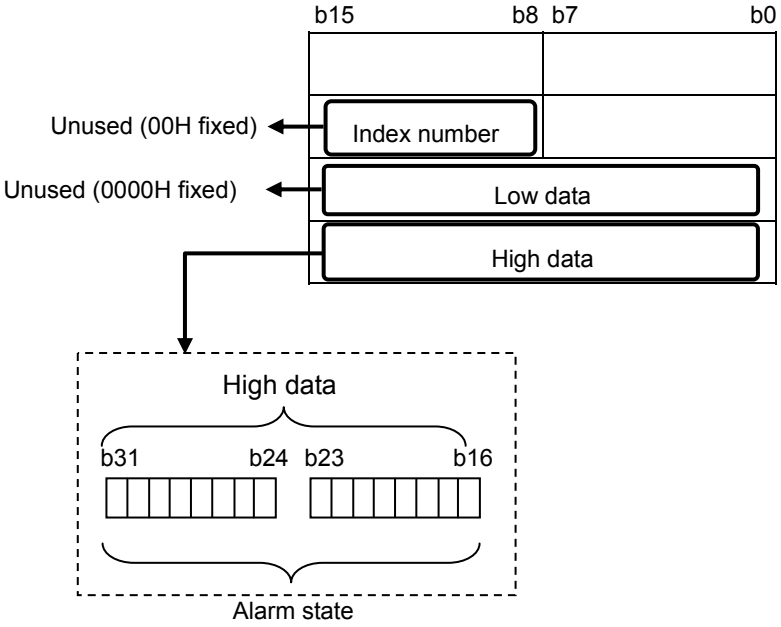
<Example : Active energy unit fixed:kWh>

Data	Multiplying factor	Numerical value	Actual value
003ADE68B1H	00H ⇒x1	FD3ADE68B1H ⇒987654321	987654321[KWh] × 1=987654321[kWh]

Note: For active energy (export), reactive energy (export/Lag) and reactive energy (export/Lead), the reply data are unsigned although the display of main device has a "-"(negative) sign.

Table 7.17 Data Format (4/8)

Data	Data Format ④
Alarm state 1 Format④	



<The allocation of the alarm state 1>

Bit	Data			ME96 SSH	ME96 SSR
	Content	ON(1)	OFF(0)		
b16	Digital Input 1	ON	OFF	○	○
b17	Digital Input 2	ON	OFF	○	○
b18	Digital Input 3	ON	OFF	○	○
b19	Digital Input 4	ON	OFF	○	○
b20	Reserved	–	–	–	–
b21	Alarm (Total)	Non-Alarm	Alarm	○	○
b22	Alarm of Current Demand	Non-Alarm	Alarm	○	○
b23	Alarm of Active power Demand	Non-Alarm	Alarm	○	–
b24	Alarm of Voltage	Non-Alarm	Alarm	○	○
b25	Alarm of Current	Non-Alarm	Alarm	○	○
b26	Alarm of Active power	Non-Alarm	Alarm	○	○
b27	Alarm of Reactive power	Non-Alarm	Alarm	○	○
b28	Alarm of Frequency	Non-Alarm	Alarm	○	○
b29	Alarm of Power factor	Non-Alarm	Alarm	○	○
b30	Alarm of T.H.D (Voltage)	Non-Alarm	Alarm	○	○
b31	Alarm of Harmonic current	Non-Alarm	Alarm	○	○

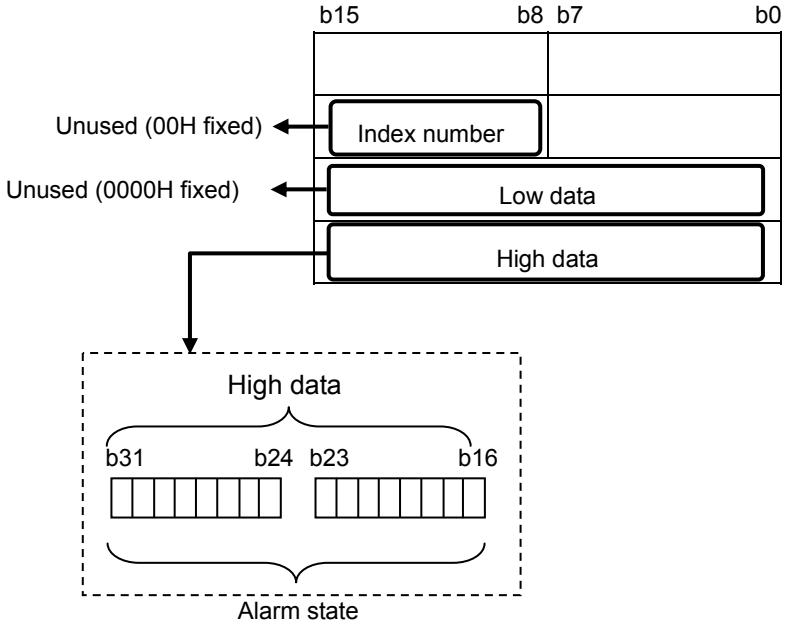
Alarm judging items of each phase wiring are shown as follows.

Upper/lower limit alarm element	Monitored phase			
	3P4W	3P3W(3CT,2CT)	1P3W（1N2）	1P3W（1N3）
Upper limit current, current demand	1, 2, 3	1, 2, 3	1, N, 2	1, N, 3
Lower limit current, current demand	1, 2, 3	1, 2, 3	1, 2	1, 3
Upper limit N-phase current, N-phase current demand	N	—	—	—
Lower limit N-phase current, N-phase current demand	N	—	—	—
Upper limit voltage (L-L) (*1)	12, 23, 31	12, 23, 31	1N, 2N, 12	1N, 3N, 13
Lower limit voltage (L-L) (*1)	12, 23, 31	12, 23, 31	1N, 2N, 12	1N, 3N, 13
Upper limit voltage (L-N)	1N, 2N, 3N	—	—	—
Lower limit voltage (L-N)	1N, 2N, 3N	—	—	—
Upper limit active power, reactive power, power factor	Total	Total	Total	Total
Lower limit active power, reactive power, power factor	Total	Total	Total	Total
Upper limit frequency	1N	12	1N	1N
Lower limit frequency	1N	12	1N	1N
Harmonic current total RMS value	1, 2, 3	1, 2, 3 (*2)	1, 2	1, 3
Harmonic current total RMS value N-phase	N	—	—	—
Harmonic voltage total distortion ratio	1N, 2N, 3N	12, 23	1N, 2N	1N, 3N
Upper limit rolling demand	Total	Total	Total	Total

*1: For phase 12 (or phase 31) at 1-phase 3-wire, alarm monitoring is executed using a value that is two times the set upper/lower limit alarm value.

*2: Only 3P3W (3CT) is measured for the phase 2 harmonic current.

<Continuation>

Data	Data Format ④
Alarm state 2 Format④	

<The allocation of the alarm state 2>

Bit	Data			ME96 SSH	ME96 SSR
	Content	ON(1)	OFF(0)		
b16	Upper limit alarm of current (phase 1)	Non-Alarm	Alarm	○	○
b17	Upper limit alarm of current (phase 2)	Non-Alarm	Alarm	○	○
b18	Upper limit alarm of current (phase 3	Non-Alarm	Alarm	○	○
b19	Upper limit alarm of current (phase N)	Non-Alarm	Alarm	○	○
b20	Upper limit alarm of current (total)	Non-Alarm	Alarm	○	○
b21	Lower limit alarm of current (total)	Non-Alarm	Alarm	○	○
b22	Upper limit alarm of L-L voltage (total)	Non-Alarm	Alarm	○	○
b23	Lower limit alarm of L-L voltage (total)	Non-Alarm	Alarm	○	○
b24	Upper limit alarm of L-N voltage (1-N)	Non-Alarm	Alarm	○	○
b25	Upper limit alarm of L-N voltage (2-N)	Non-Alarm	Alarm	○	○
b26	Upper limit alarm of L-N voltage (3-N)	Non-Alarm	Alarm	○	○
b27	Upper limit alarm of L-N voltage (total)	Non-Alarm	Alarm	○	○
b28	Lower limit alarm of L-N voltage (1-N)	Non-Alarm	Alarm	○	○
b29	Lower limit alarm of L-N voltage (2-N)	Non-Alarm	Alarm	○	○
b30	Lower limit alarm of L-N voltage (3-N)	Non-Alarm	Alarm	○	○
b31	Lower limit alarm of L-N voltage (total)	Non-Alarm	Alarm	○	○

Table 7.18 Data Format (5/8)

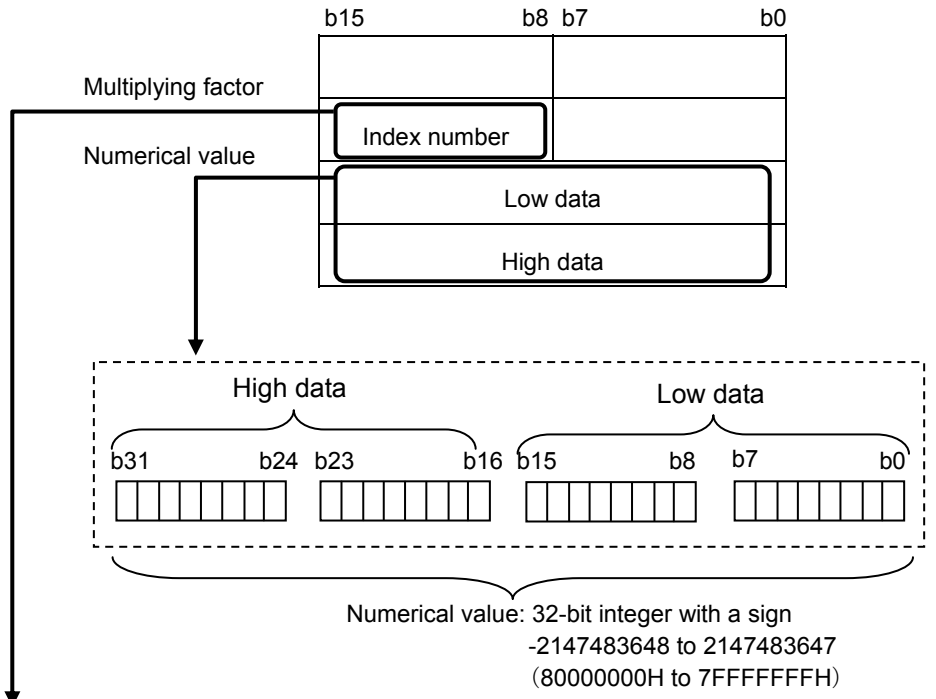
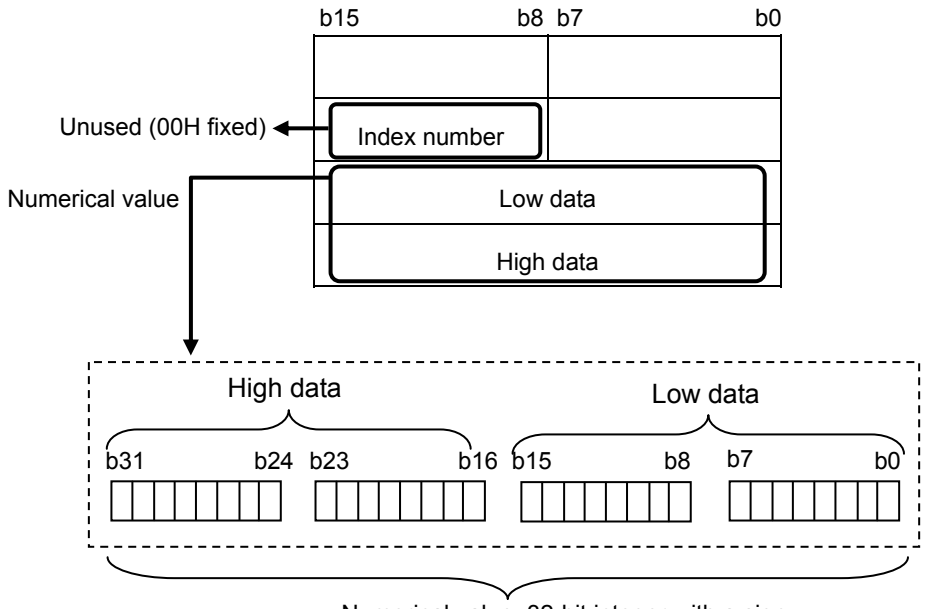
Data	Data Format ⑤
Setting Items Primary current, Primary Voltage, Secondary current, Secondary Voltage, Frequency, etc. Format⑤	 <Multiplying factor> Multiplying factor is fixed according to setting of the phase wiring, primary voltage and primary current. (Refer to 7.2.5). Index number = 00H: The actual value is the numeric value. Index number = FFH: The actual value is 10^{-1} times the numeric value <Example: Primary current > Setting data = 100.0A; $x10^{-1}$ ⇒FFH; 1000⇒03E8H; FF000003E8H Setting data = 400A; x1 ⇒00H; 400⇒0190H; 0000000190H <Example: Primary voltage> Setting data = 110.0V; $x10^{-1}$ ⇒FFH; 1100⇒044CH; FF0000044CH Setting data = 3300V; x1 ⇒00H; 3300⇒0CE4H; 0000000CE4H

Table 7.19 Data Format (6/8)

Data	Data Format ⑥
Setting Items Phase wiring, Time constant for current demand, Interval time, Subinterval time etc. Format⑥	 Numerical value: 32-bit integer with a sign -2147483648 to 2147483647 (80000000H to 7FFFFFFFH)

<Data(Numerical value)>

1) Phase wiring

Setting data	Data	Note.
Single phase 2 wire (1P2W)	00000001H	
Single phase 3 wire (1P3W)(1N3 display)	00000002H	
Three phase 3 wire (3P3W_2CT)	00000003H	
Three phase 4 wire (3P4W)	00000004H	
Single phase 3 wire (1P3W)(1N2 display)	00000005H	
Three phase 3 wire (3P3W_3CT)	00000006H	

2) Time constant for current demand

Example	Data	Note.
2 minutes = 120 seconds	00000078H	

3) Interval time / Subinterval time

Example	Data	Note.
15 minutes	0000000FH	

4) Byte monitor

Model	Data	Note.
ME96SSH-MB/ME96SSR-MB	C50A 0500H	

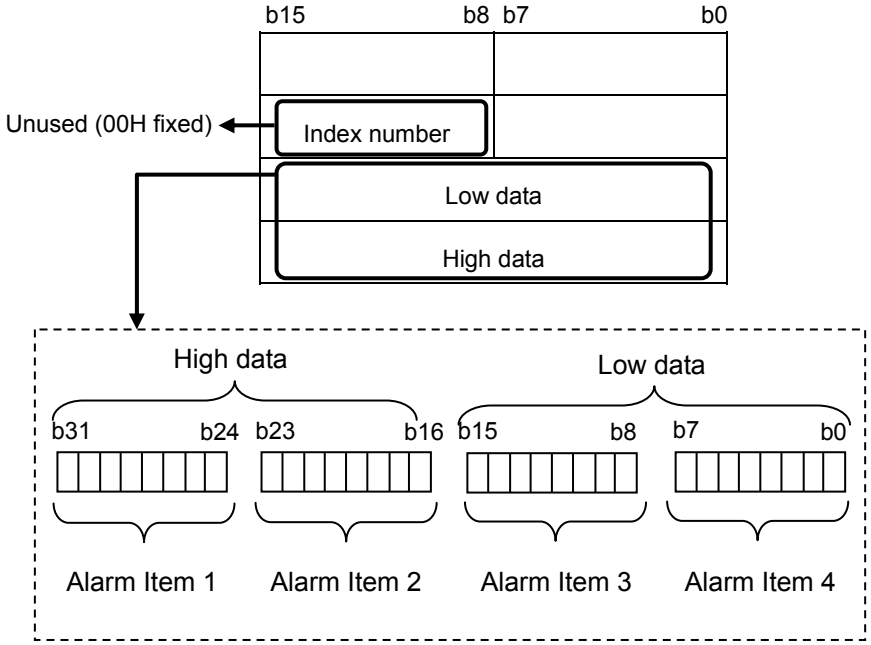
5) Attribute monitor

Model	Data	Note.
ME96SSH-MB/ME96SSR-MB	C510 1000H	

6) Model code

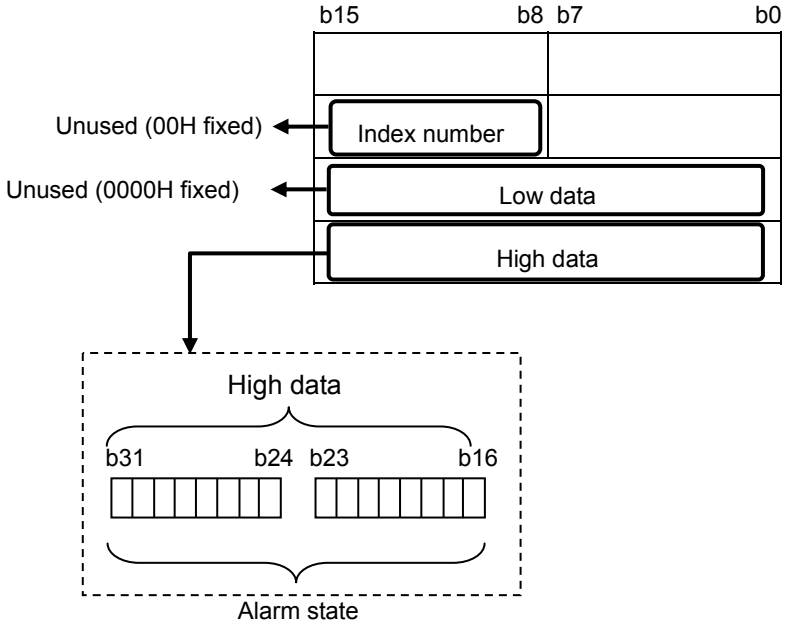
Example	Data	Note.
ME96SSH-MB	00000014H	
ME96SSR-MB	00000013H	

Table 7.20 Data Format (7/8)

Data	Data Format ⑦
Setting Items Alarm Item Format⑦	 Note: The numbers of alarms which can set are 4 items. <Content of alarm items>

Data		Explanation	ME96 SSH	ME96 SSR
Dec.	Hex.			
00	00	No alarm	○	○
01	01	The upper limit alarm of current	○	○
02	02	The lower limit alarm of current	○	○
03	03	The upper limit alarm of phase N current	○	○
09	09	The upper limit alarm of current demand	○	○
10	0A	The lower limit alarm of current demand	○	○
11	0B	The upper limit alarm of phase N current demand	○	○
17	11	The upper limit alarm of L-L voltage	○	○
18	12	The lower limit alarm of L-L voltage	○	○
19	13	The upper limit alarm of L-N voltage	○	○
20	14	The lower limit alarm of L-N voltage	○	○
21	15	The upper limit alarm of active power	○	○
22	16	The lower limit alarm of active power	○	○
23	17	The upper limit alarm of rolling demand	○	-
25	19	The upper limit alarm of reactive power	○	○
26	1A	The lower limit alarm of reactive power	○	○
27	1B	The upper limit alarm of power factor	○	○
28	1C	The lower limit alarm of power factor	○	○
29	1D	The upper limit alarm of frequency	○	○
30	1E	The lower limit alarm of frequency	○	○
31	1F	The upper limit alarm of current harmonic	○	○
32	20	The upper limit alarm of voltage harmonic	○	○
33	21	The upper limit alarm of phase N current harmonic	○	○

Table 7.21 Data Format (8/8)

Data	Data Format ⑧
Setting Items 16bit set register1 Format⑧	

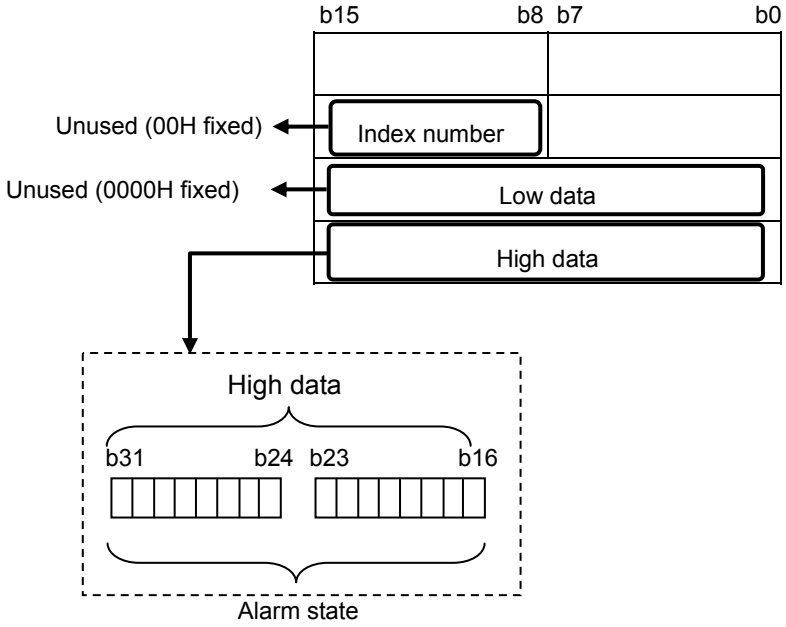
<16bit set register 1>

Bit	Data			ME96 SSH	ME96 SSR
	Content	ON(1)	OFF(0)		
b16	Reset of all alarm	executed	—	○	○
b17	Reset of all energy(*1) and all max/min value(*2)	executed	—	○	○
b18	Reset of all max/min value(*2)	executed	—	○	○
b19	Unusable	—	—	—	—
b20	Unusable	—	—	—	—
b21	Unusable	—	—	—	—
b22	Unusable	—	—	—	—
b23	Unusable	—	—	—	—
b24	Reset of all digital input (DI) latch	executed	—	○	○
b25	Unusable	—	—	—	—
b26	Unusable	—	—	—	—
b27	Unusable	—	—	—	—
b28	Unusable	—	—	—	—
b29	Unusable	—	—	—	—
b30	Reset of all energy(*1)	executed	—	○	○
b31	Unusable	—	—	—	—

*1: Periodic active energy (period 1/2) are not reset. Active energy (import/export), reactive energy (import(LEAD/LAG) /export(LEAD/LAG)), apparent energy and operating time are reset.
*2: Maximum value of rolling demand power is not reset.

<Continuation>

Data	Data Format ⑧
Setting Items 16bit set register2 Format⑧	



<16bit set register 2>

Bit	Data			ME96 SSH	ME96 SSR
	Content	ON(1)	OFF(0)		
b16	Select of periodic active energy (period 1) (*1)	Select	Cancel	○	○
b17	Select of periodic active energy (period 2) (*1)	Select	Cancel	○	○
b18	Unusable	—	—	○	○
b19	Unusable	—	—	—	—
b20	Reset of periodic active energy (period 1)	executed	—	—	—
b21	Reset of periodic active energy (period 2)	executed	—	—	—
b22	Unusable	—	—	—	—
b23	Unusable	—	—	—	—
b24	Reset of maximum value of rolling demand power	executed	—	○	—
b25	Unusable	—	—	—	—
b26	Unusable	—	—	—	—
b27	Unusable	—	—	—	—
b28	Unusable	—	—	—	—
b29	Unusable	—	—	—	—
b30	Restart of rolling demand calculation	executed	—	○	—
b31	Unusable	—	—	—	—

*1: When the bit in on(1), the active energy (import) is add to the active energy (period n). (where n= 1, 2)

7.2.5 Multiplying factor

The conditions of multiplying factor by setup of each element are shown befow.

Table 7.22 Multiplying factor

Element	Unit	Condition		Multiplying factor
Voltage Harmonics voltage	V	Primary voltage	less than 440V	$x10^{-1}$
			440V or more	x1
Current Current demand Harmonics current	A	Primary current	less than 4A	$x10^{-3}$
			4A or more and less than 40A	$x10^{-2}$
			40A or more and less than 400A	$x10^{-1}$
			400A or more and less than 4000A	x1
Active power Rolling demand power Reactive power Apparent power	kW kvar kVA	Total load power *1	0kW or more and less than 1.2kW	$x10^{-4}$
			1.2kW or more and less than 12kW	$x10^{-3}$
			12kW or more and less than 120kW	$x10^{-2}$
			120kW or more and less than 1200kW	$x10^{-1}$
			1200kW or more and less than 12000kW	x1
			12000kW or more and less than 120000kW	x10
			120000kW or more	$x10^{2}$
Active energy Reactive energy Apparent energy	kWh kvarh kVAh	Total load power *1	0kW or more and less than 10kW	$x10^{-2}$
			10kW or more and less than 100kW	$x10^{-1}$
			100kW or more and less than 1000kW	x1
			1000kW or more and less than 10000kW	x10
			10000kW or more and less than 100000kW	$x10^{2}$
			100000kW or more	$x10^{3}$
Active energy (extended) Reactive energy (extended)	kWh kvarh	Total load power *1	0kW or more and less than 10kW	$x10^{-5}$
			10kW or more and less than 100kW	$x10^{-4}$
			100kW or more and less than 1000kW	$x10^{-3}$
			1000kW or more and less than 10000kW	$x10^{-2}$
			10000kW or more and less than 100000kW	$x10^{-1}$
			100000kW or more	x1
Power factor	%	-	-	$x10^{-1}$
Frequency	Hz	-	-	$x10^{-1}$
Harmonics distortion (Current)	%	-	-	$x10^{-1}$
Harmonics distortion (Voltage)	%	-	-	$x10^{-1}$
Active energy (unit: Wh fixed) Reactive energy (unit: varh fixed) Apparent energy (unit: VA fixed)	Wh varh VAh	-	-	$x10^{-3}$
Active energy (unit: kWh fixed) Reactive energy (unit: kvarh fixed) Apparent energy (unit: kVA fixed)	kWh kvarh kVAh	-	-	x1
Active energy (unit: MWh fixed) Reactive energy (unit: Mvarh fixed) Apparent energy (unit: MVA fixed)	MWh Mvarh MVAh	-	-	$x10^{3}$
Operating time	h	-	-	x1

*1: How to calculate primary rated power is the as follows.

$$\text{Total rated power[kW]} = \frac{\alpha \times (\text{Primary voltage}) \times (\text{Primary current})}{1000}$$

Phase wiring	α	Note
1P2W	α=1	
1P3W	α=2	Primary voltage is L-N voltage.
3P3W	α=1.732	
3P4W	α=3	Primary voltage is L-N voltage.

7.2.6 About Error Occurrence

When the command and related data transmitted to ME96 is improper or ME96 is in H/W error, RX(n+7)A (Error status flag) becomes 1(ON), the error code shown in Table 7.23 is returned as reply data.

Table 7.23 Error Code

Error Description	Error Code (Hex.)
Illegal command or packet length	40h
Invalid group number	41h
Invalid channel number	42h
ME96 is in set-up mode or test mode	43h, 44h
Invalid data for set-up	51h
It is not set the item of alarm	55h

If an error occurs, the error code is written into the RWrn as shown in the figure below, and RX(n+7)A (error status flag) is turned on (error occurrence) and RX(n+7)B (remote READY) is turned off (normal communication stop). For the error resetting method, refer to “6.3 Error Communication”.

8. Abbreviations and Special Terms

Abbreviations and special terms used in this manual are shown below:

Abbreviation and Special Terms	Description
Master station	Station which controls remote stations and local stations. One station is required for one system.
Local station	Station with the CPU which can communicate with master station and other local stations.
Remote I/O station	Remote station which deals with bit information only.
Remote device station	Remote station which deals with bit information and word information.
Remote station	General name for remote I/O station and remote device station. Controlled by a master station.
Intelligent device station	Station that can perfom transient transmission.
RX	Remote input
RY	Remote output
RWw	Remote register (write area)
RWr	Remote register (read area)
Command	Identification code allocated to items to be monitored or set. ME96 uses a special-purpose command that is transmitted to monitor each measurement value or set each parameter.
Demand value	The demand value is an approximate average value during the demand time period. When it is set to 0, each demand present value becomes equivalent to the present value.

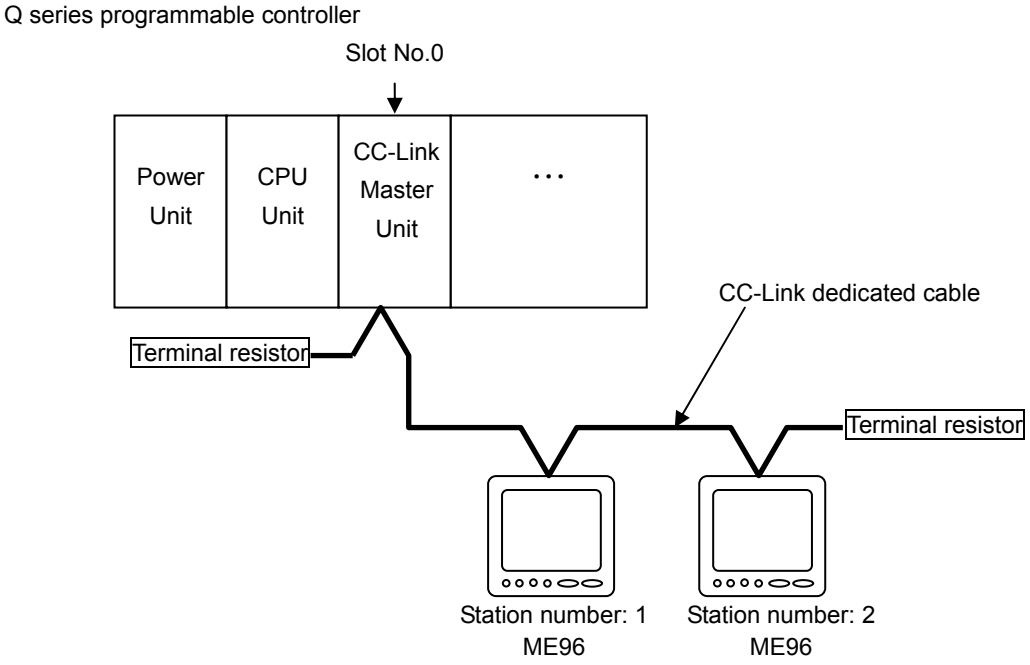
9. Program Example

9.1 Program Content

This program example is assumed the system configuration in below.
In the program, at first, the parameters of the linked number and station information are set, and the data link with the parameter of buffer memory startes up.
Next, the reading data shown in below is monitored continuously.
Also, this program is made by using “SW8D5C-GPPW GX Developer”.

Note: The refresh set with the automatic refresh parameters and the refresh executed with the FROM/TO instructions cannot be performed simultaneously.

9.2 System Configuration



※Reading data

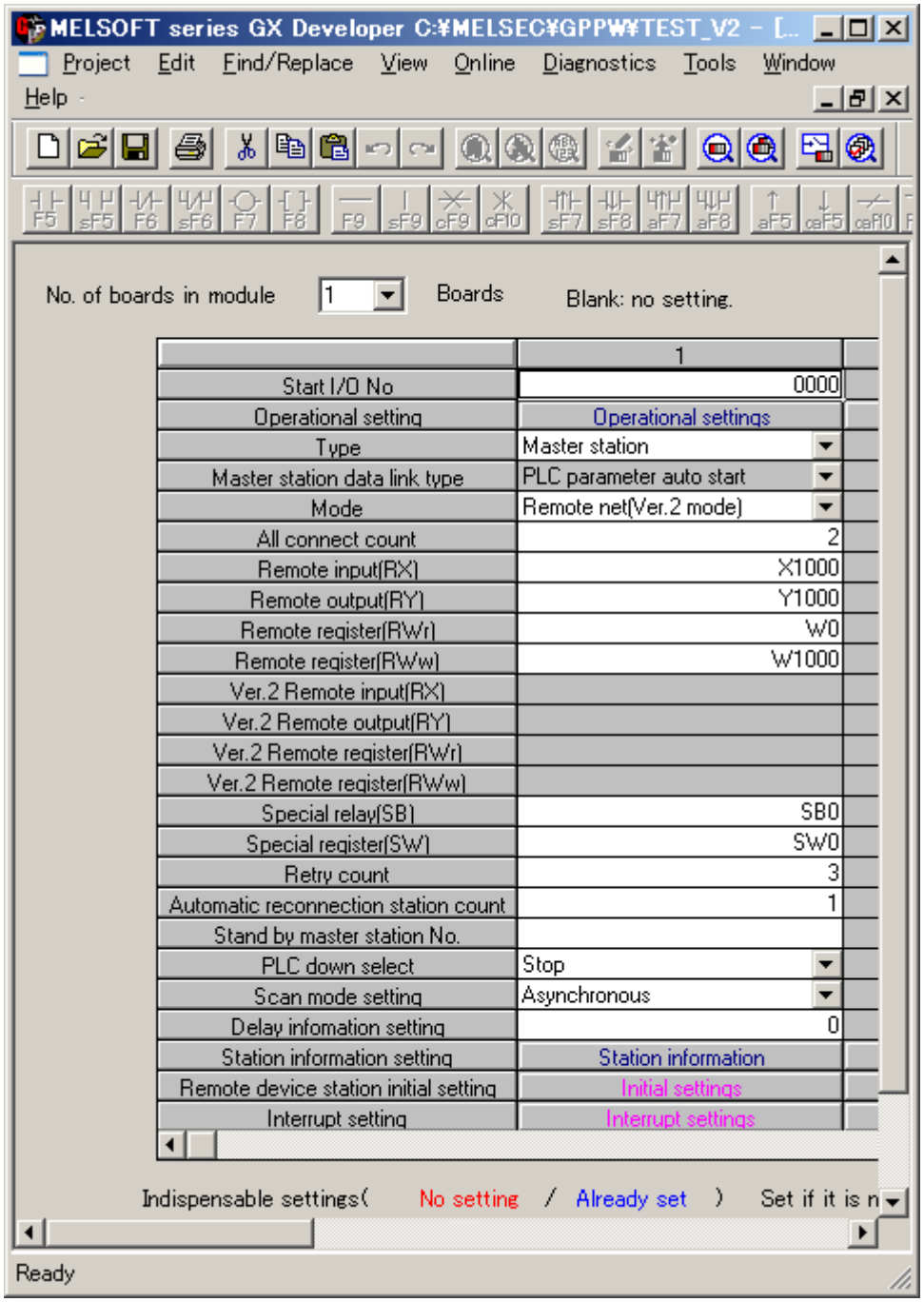
Station number 1: ME96	Moniter using monitoring by pattern (P08). Phase 1 current, Phase 2 current, Phase 3 current, 1-2 voltage, 2-3 voltage, 3-1 voltage, Total active power, Active energy (import).
	Moniter using monitoring by command(1H). Total reactive power, Total power factor, Rective energy (import lag).
Station number 2: ME96	Same as above.

9.3 Parameter Settings

Parameter settings are set as following with GX Developer.

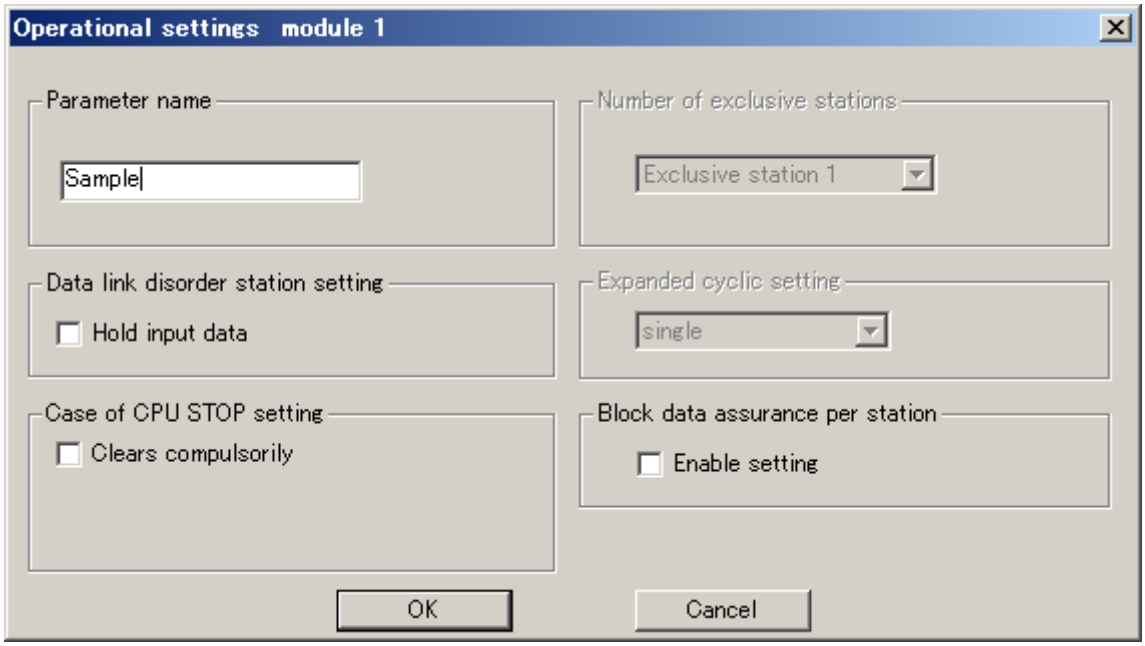
9.3.1 Network Parameter Settings and Auto Refresh Parameter Settings

The following is shown CC-Link network parameter settings and auto refresh parameter settings.


MELSOFT series GX Developer C:¥MELSEC¥GPPW¥TEST_V2 - [...
Project Edit Find/Replace View Online Diagnostics Tools Window
Help
No. of boards in module 1 Boards
Blank: no setting.
1
Start I/O No 0000
Operational setting Operational settings
Type Master station
Master station data link type PLC parameter auto start
Mode Remote net(Ver.2 mode)
All connect count 2
Remote input(RX) X1000
Remote output(RY) Y1000
Remote register(RWr) W0
Remote register(RWw) W1000
Ver.2 Remote input(RX)
Ver.2 Remote output(RY)
Ver.2 Remote register(RWr)
Ver.2 Remote register(RWw)
Special relay(SB) SB0
Special register(SW) SW0
Retry count 3
Automatic reconnection station count 1
Stand by master station No.
PLC down select Stop
Scan mode setting Asynchronous
Delay infomation setting 0
Station information setting Station information
Remote device station initial setting Initial settings
Interrupt setting Interrupt settings
Indispensable settings(No setting / Already set) Set if it is n
Ready

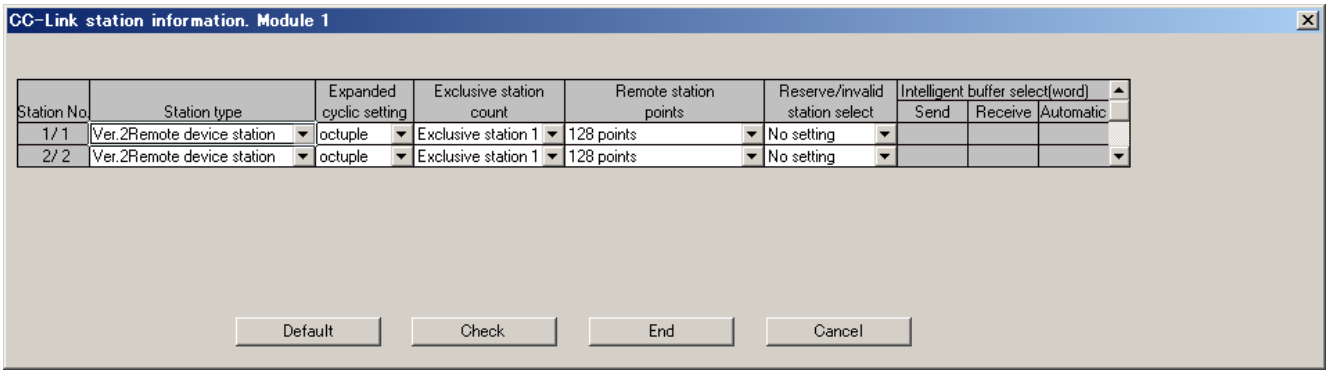
9.3.2 Operational Settings

Operational settings are as follows.



9.3.3 Station Information Settings

Station information settings are as follows.



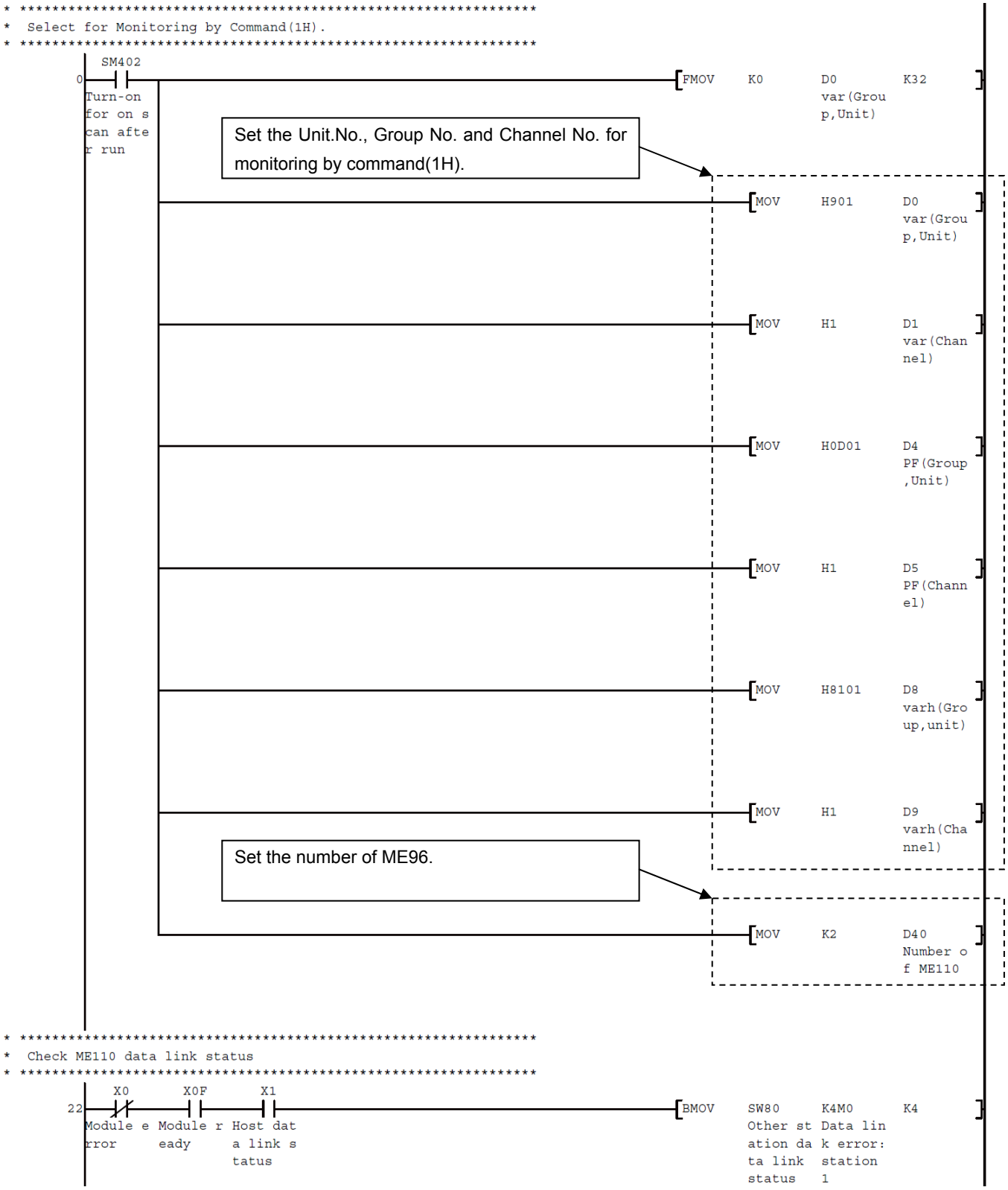
9.4 Device Allocation

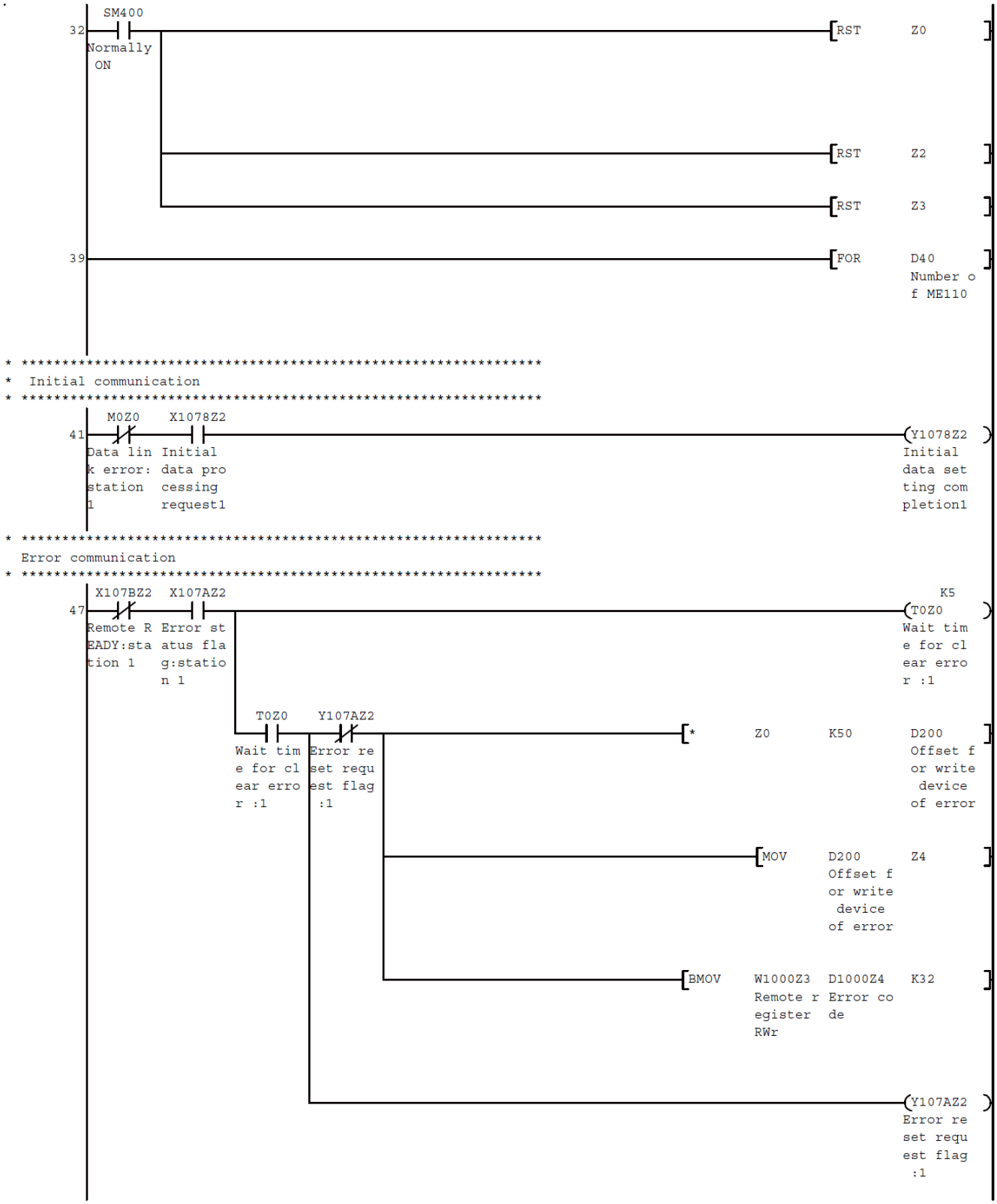
Allocation of transmitted device

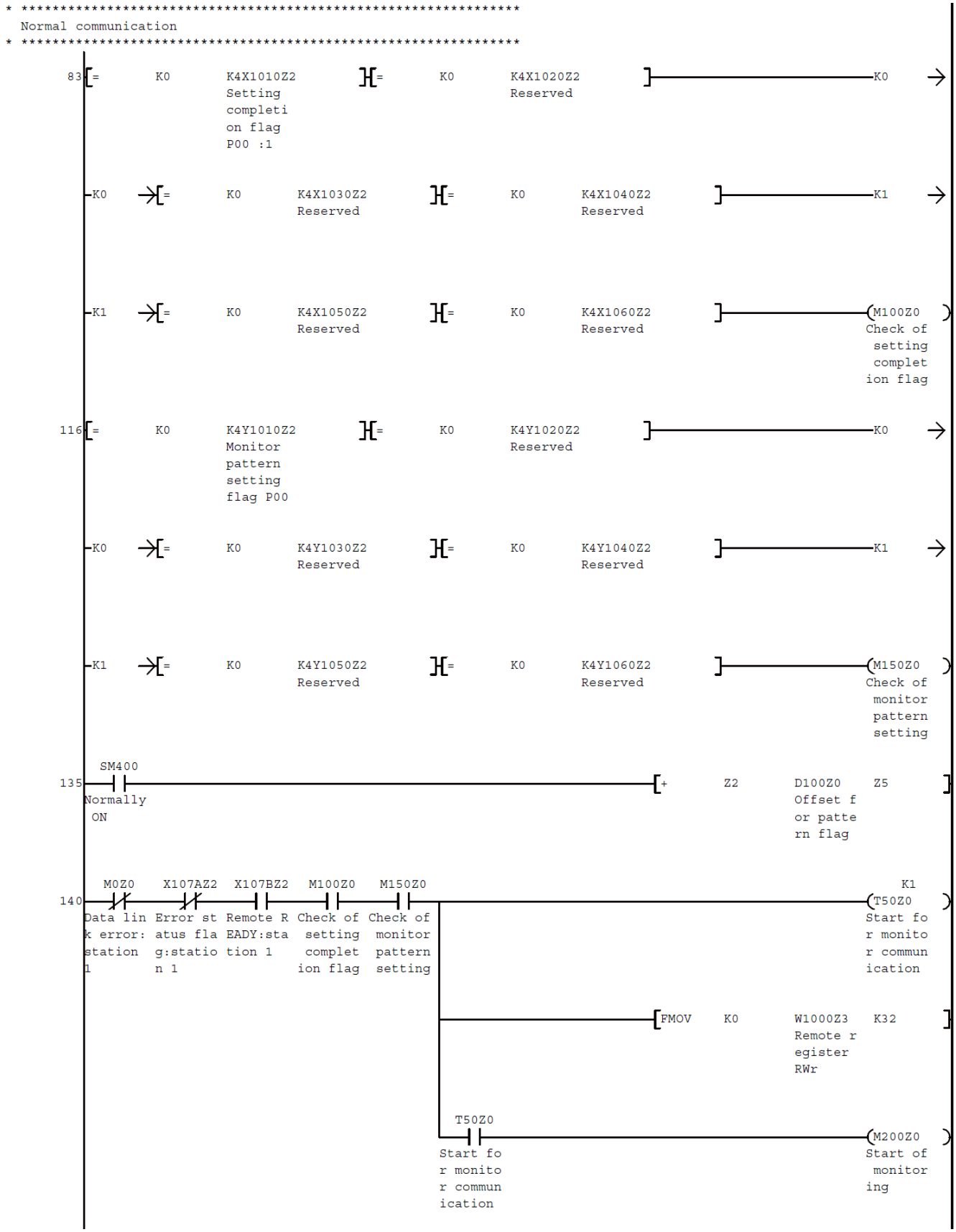
Items	Contents	Device No.	Note
Remote input (RX)	Station number 1: Remote input (RX00 to RX7F)	X1000 to X107F	Set X100 to remote input(RX) refresh device.
	Station number 2: Remote input (RX00 to RX7F)	X1080 to X10FF	
Remote output (RY)	Station number 1: Remote output (RY00 to RY7F)	Y1000 to Y107F	Set Y100 to remote output(RY) refresh device.
	Station number 2: Remote output (RY00 to RY7F)	Y1080 to Y10FF	
Remote register (RWr)	Station number 1: Remote register(RWr0 to RWr3)	W0000 to W001F	Set W300 to remote register(RWr) refresh device.
	Station number 2: Remote register (RWr0 to RWr3)	W0020 to W003F	
Remote register (RWw)	Station number 1: Remote register (RWw0 to RWw3)	W1000 to W101F	Set W400 to remote register(RWw) refresh device.
	Station number 2: Remote register (RWw0 to RWw3)	W1020 to W103F	
Link special relay (SB)	Link special relay of master station (SB0 to SB01FF)	SB0 to SB01FF	Set SB0 to link special relay(SB) refresh device.
Link special register (SW)	Link special register of master station (SW0 to SW01FF)	SW0 to SW01FF	Set SW0 to link special register(SW) refresh device.
Items of sending data	Sending data for monitoring by command(1H).	D0 to D32	Number of items are mentioned in section 9.2.
Error code	For station number 1:	D1000 to D1031	
	For station number 2:	D1050 to D1081	
Station error	For station number 1:	M0	0: Normal 1: Data link error occurred
	For station number 2:	M1	
Check of setting completion flag	For station number 1:	M100	To check the OFF.
	For station number 2:	M101	
Check of monitor pattern setting flag	For station number 1:	M150	To check the OFF.
	For station number 2:	M151	
Start of monitoring	For station number 1:	M200	
	For station number 2:	M201	
Start of received data	For station number 1:	M250	
	For station number 2:	M251	
Reception of error for monitoring by pattern	For station number 1:	M300	
	For station number 2:	M301	
Wait time for clear error	For station number 1:	T0	
	For station number 2:	T1	
Start time for monitor communication	For station number 1:	T50	
	For station number 2:	T51	
Reception time for monitoring by pattern	For station number 1:	T100	
	For station number 2:	T101	
Time out	For station number 1:	T150	
	For station number 2:	T151	
Index modification	For the select of station number	Z0	Uses Z0 or Z1. (To be Indexed the timer)
	For the flag of remote I/O	Z2	
	For the remote register	Z3	
	For the write device of received data	Z4	
	For the flag of monitoring by pattern	Z5	

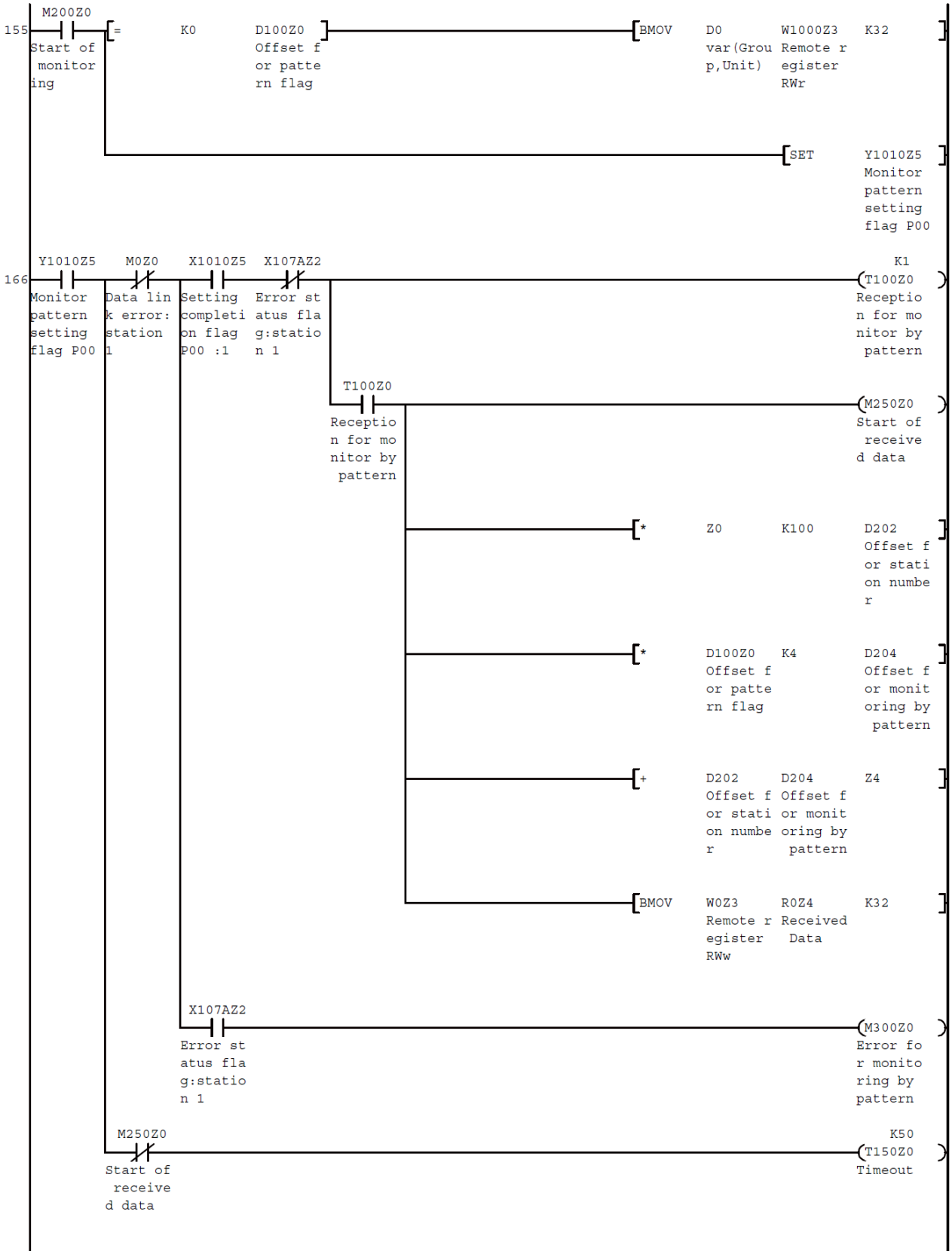
Items	Contents			Device No.	Note
Received data	Station number 1	Total reactive power	Multiplying factor, 00h	R1	Active value = Numerical value × Multiplying factor
			Numerical value	R2, R3	
		Total power factor	Multiplying factor, 00h	R5	
			Numerical value	R6, R7	
		Reactive energy (import lag)	Multiplying factor, 00h	R9	
			Numerical value	R10, R11	
		Phase 1 current	Multiplying factor, 00h	R33	
			Numerical value	R34, R35	
		Phase 2 current	Multiplying factor, 00h	R37	
			Numerical value	R38, R39	
		Phase 3 current	Multiplying factor, 00h	R41	
			Numerical value	R42, R43	
		1-2 voltage	Multiplying factor, 00h	R45	
			Numerical value	R46, R47	
		2-3 voltage	Multiplying factor, 00h	R49	
			Numerical value	R50, R51	
		3-1 voltage	Multiplying factor, 00h	R53	
			Numerical value	R54, R55	
		Total active power	Multiplying factor, 00h	R57	
			Numerical value	R58, R59	
		Active energy (import)	Multiplying factor, 00h	R61	
			Numerical value	R62, R63	
	Station number 2	Total reactive power	Multiplying factor, 00h	R101	Active value = Numerical value × Multiplying factor
			Numerical value	R102, R103	
		Total power factor	Multiplying factor, 00h	R105	
			Numerical value	R106, R107	
		Reactive energy (import lag)	Multiplying factor, 00h	R109	
			Numerical value	R110, R111	
		Phase 1 current	Multiplying factor, 00h	R133	
			Numerical value	R134, R135	
		Phase 2 current	Multiplying factor, 00h	R137	
			Numerical value	R138, R139	
		Phase 3 current	Multiplying factor, 00h	R141	
			Numerical value	R142, R143	
		1-2 voltage	Multiplying factor, 00h	R145	
			Numerical value	R146, R147	
		2-3 voltage	Multiplying factor, 00h	R149	
			Numerical value	R150, R151	
		3-1 voltage	Multiplying factor, 00h	R153	
			Numerical value	R154, R155	
		Total active power	Multiplying factor, 00h	R157	
			Numerical value	R158, R159	
		Active energy (import)	Multiplying factor, 00h	R161	
			Numerical value	R162, R163	

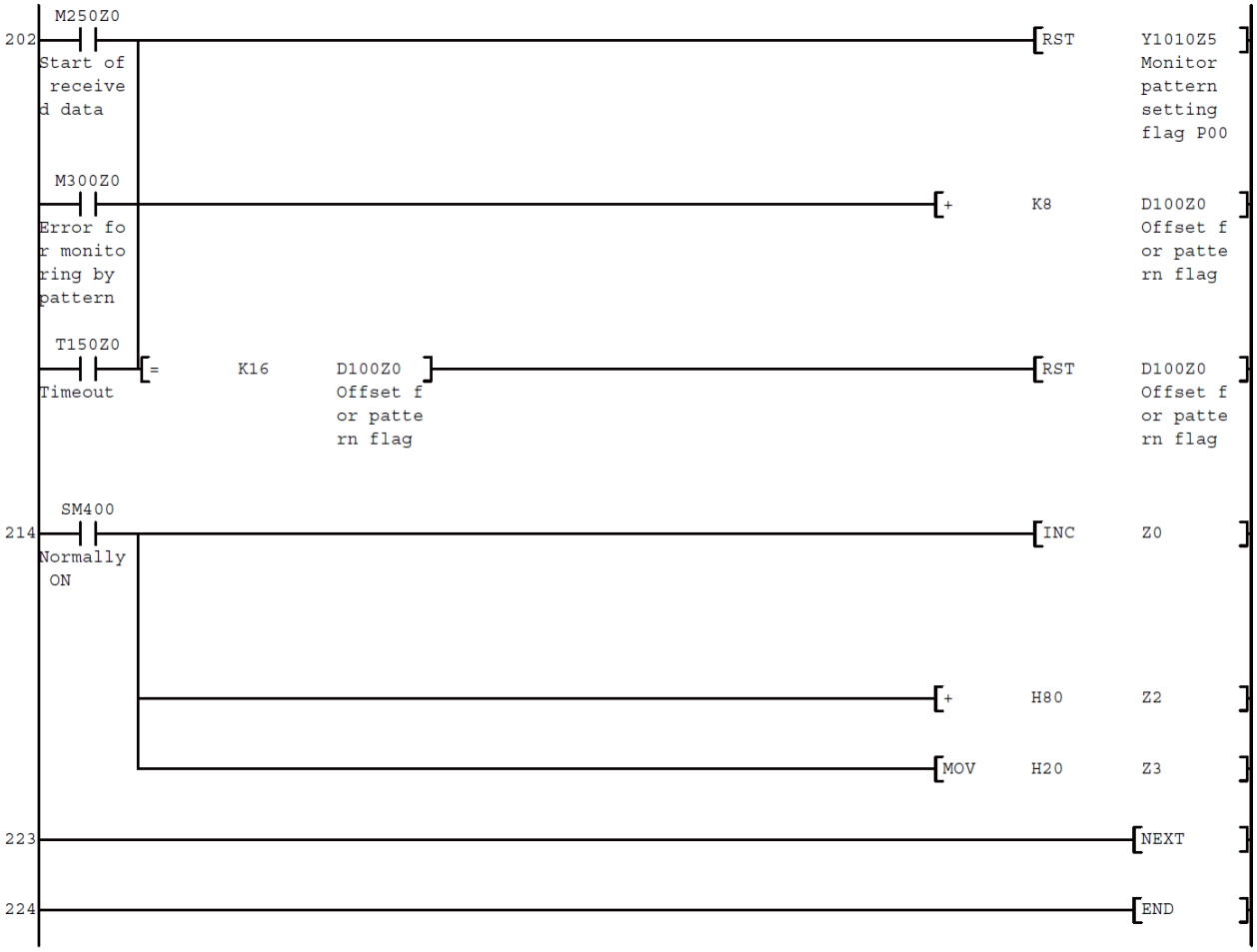
9.5 Program Example




SM400
32
Normally ON
RST Z0
RST Z2
RST Z3
39
FOR D40 Number of ME110
* Initial communication
M0Z0
X1078Z2
41
Data link error: station 1
Initial data processing request1
Y1078Z2 Initial data setting completion1
* Error communication
X107BZ2
X107AZ2
47
Remote READY:station 1
Error status flag:station 1
K5
T0Z0 Wait time for clear error :1
T0Z0
Y107AZ2
Wait time for clear error :1
Error reset request flag :1
* Z0 K50 D200 Offset for write device of error
MOV D200 Offset for write device of error Z4
BMOV W1000Z3 Remote register RWr D1000Z4 Error code K32
Y107AZ2 Error reset request flag :1


* **
Normal communication
* **
83
= K0 K4X1010Z2 Setting completion flag P00 :1
= K0 K4X1020Z2 Reserved
K0
K0
= K0 K4X1030Z2 Reserved
= K0 K4X1040Z2 Reserved
K1
K1
= K0 K4X1050Z2 Reserved
= K0 K4X1060Z2 Reserved
M100Z0 Check of setting completion flag
116
= K0 K4Y1010Z2 Monitor pattern setting flag P00
= K0 K4Y1020Z2 Reserved
K0
K0
= K0 K4Y1030Z2 Reserved
= K0 K4Y1040Z2 Reserved
K1
K1
= K0 K4Y1050Z2 Reserved
= K0 K4Y1060Z2 Reserved
M150Z0 Check of monitor pattern setting
SM400
135
Normally ON
+ Z2 D100Z0 Offset for pattern flag Z5
M0Z0
X107AZ2
X107BZ2
M100Z0
M150Z0
140
Data link error: station 1
Error status flag:station 1
Remote READY:station 1
Check of setting completion flag
Check of monitor pattern setting
K1
T50Z0 Start for monitor communication
FMOV K0 W1000Z3 Remote register RWr K32
T50Z0
Start for monitor communication
M200Z0 Start of monitoring


155
M200Z0
Start of monitoring
=
K0
D100Z0
Offset for pattern flag
BMOV
D0
var(Group,Unit)
W1000Z3
Remote register RWr
K32
SET
Y1010Z5
Monitor pattern setting flag P00
166
Y1010Z5
Monitor pattern setting flag P00
M0Z0
Data link error: station 1
X1010Z5
Setting completion flag P00 :1
X107AZ2
Error status flag:station 1
K1
T100Z0
Reception for monitor by pattern
T100Z0
Reception for monitor by pattern
M250Z0
Start of received data
*
Z0
K100
D202
Offset for station number
*
D100Z0
Offset for pattern flag
K4
D204
Offset for monitoring by pattern
+
D202
Offset for station number
D204
Offset for monitoring by pattern
Z4
BMOV
W0Z3
Remote register RWw
R0Z4
Received Data
K32
X107AZ2
Error status flag:station 1
M300Z0
Error for monitoring by pattern
M250Z0
Start of received data
K50
T150Z0
Timeout


202
M250Z0
Start of receive d data
RST
Y1010Z5
Monitor pattern setting flag P00
M300Z0
Error fo r monito ring by pattern
+
K8
D100Z0
Offset f or patte rn flag
T150Z0
Timeout
=
K16
D100Z0
Offset f or patte rn flag
RST
D100Z0
Offset f or patte rn flag
214
SM400
Normally ON
INC
Z0
+
H80
Z2
MOV
H20
Z3
223
NEXT
224
END

10. Test Mode

ME96 has the test mode which the fixed values are replied even if the voltage and current are not input. It can be used to check the communication to programmable controller.

10.1 ME96SSH-MB/ME96SSR-MB

(1) Shift to Test Mode

Operation of ME96 is necessary. At first, shifts to the setting value confirmation mode from the operation mode. And then, select “9” of menu number, and shifts to the test menu screen. And then, select “1” of menu number, and shifts to the test mode. (For details, refer to each user’s manual)

(2) How to Test

In the test mode, you need to appear values which wanted to monitor on the screen of ME96. For example, if you want to monitor the active power, you need to appear the active power on the screen of ME96.

① Replied Data

Values displayed on the screen of ME96 can be monitored by CC-Link communication. Measurement elements not displayed on the screen are zero (only power factor is 1.000). When DI1 to DI4 are used, it is also possible to monitor the digital input status.

② Display screen

In the same as the operating mode, items are displayed when making settings such as those for the display pattern. Maximum and minimum values can be displayed. (Cyclic function is invalid.)

③ Button Operations

Button	Operation
[DISPLAY]	Display is changed.
[PHASE]	Phase is changed.
[MAXMIN]	Mode is changed to the maximum/minimum display and the instantaneous display.
[+], [-]	The item expressed with the bar graph is changed. And, harmonics number is changed when harmonics displayed.
[+]+[-] for 2 seconds	The unit of Wh, varh and VAh is changed.
[SET]	Test mode is finished and back to test menu screen.